

7-2M

K. Roberts  
WTS

# INVENTORY OF RESEARCH PROJECTS

1977-78

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178.7  
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I58  
1978  
MOE



Ministry  
of the  
Environment

The Honourable  
George R. McCague,  
Minister

K.H. Sharpe,  
Deputy Minister

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Ontario

Ref. 73038

Ministry of the  
Environment  
248-3739

Letter No. 158

135 St. Clair Avenue West  
Suite 100  
Toronto Ontario  
M4V 1P5

May 10, 1978

Memorandum to: RESEARCH ADVISORY COMMITTEE

B. I. Boyko	D. A. McTavish
T. G. Brydges	G. C. Ronan
D. P. Caplice (J.B. Patterson)	W. R. Smithies
M. Fitch	S. Stevens
P. D. Foley (Chairman)	D. W. Wilson

Copied to: Names on attached list

From: D. F. Rhodes  
Manager, Environmental Research  
Provincial Lottery Trust Fund

Subject: Inventory of Research Projects 1977-78  
Ministry of the Environment

The Inventory of Research Projects 1977-78, for the Ministry of the Environment has now been compiled and 100 copies have been printed for future use and distribution. A copy of the Inventory is herewith sent to you and to the names on attached list.

Should you have any comments on the Inventory, please advise me. If you require extra copies of it for yourself or others, I will be pleased to supply them upon request. At the present time, there are twelve copies of the FY 76/77 Inventory of Research Projects remaining in storage at the Development and Research Group, Laboratory, Resources Road.

D. F. Rhodes

DFR:mm  
attach.

Copies of Letter No. 158 and Inventory  
of Research Projects 1977-78 sent to:

Board, Committee Branch or Office	Section Unit or Group	Name
Minister		G. R. McCague
Deputy Minister		K. H. Sharpe
Program Planning and Evaluation		A. Castel
Pesticides Advisory		A. R. Chisholm
Waste Management		P. J. Crabtree
Information Services		R. J. Frewin
	Library	N. J. McIlroy
Environmental Assessment and Planning		J. W. Giles W. A. Steggle
Environmental Approvals	Director	D. P. Caplice
	Environmental Assessment	V. W. Rudik
Pollution Control	Director	K. E. Symons
	Industrial	E. W. Turner
	Applied Sciences	M. B. Fielding
	Water Technology	<u>K. J. Roberts</u>
	Wastewater Treatment	S. A. Black
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Air Resources	Director	A. J. Harris
	Program Planning	C. B. Martin
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Regional Operations	Director	W. Bidell
	Northwestern	R. M. Gotts
	Northeastern	C. E. McIntyre
	Southwestern	(D. A. McTavish)
	West-Central	C. J. Macfarlane
	Central Region	P. G. Cockburn
	Southeastern	R. E. Moore
Laboratory Services	Assistant Director	P. Diosady



PREFACE

The Inventory of Research Projects is produced by the Research Advisory Committee with the assistance of staff of the Development and Research Group. Any questions concerning specific projects should be addressed to the Director of the Branch which initiated the study.

P. D. Foley,  
Chairman,  
Research Advisory Committee.

ENTERED JUL 14 2003

F. Y. 1977/1978

INVENTORY OF RESEARCH PROJECTS

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Standards Development Branch  
LIBRARY

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## INTRODUCTION

### ORIGIN

The Ministry first published an inventory of research and development projects in June, 1973. The publication was initiated by the Deputy Minister who recognized the need for a comprehensive list of research and development projects which would be readily available to all agencies. The initial report was prepared by the Strategic Planning Branch. The Research Advisory Committee was appointed in 1975 and is now responsible for the preparation of the report.

### PURPOSE

The purpose of this report is to promote the communication of the Ministry of the Environment's activities to the research community, and to facilitate a more efficient use of capital and human resources devoted to environmental research. It is hoped that the information contained here will assist those currently conducting studies, by providing them with access to projects in this Ministry which are related to their own. Another major objective is to foster co-operative efforts and prevent the duplication of programs, particularly among Ministries of the Ontario Government. Ultimately, the inventory and successive updates will provide a comprehensive background for the selection of environmental research priorities, revealing those areas which are already being extensively examined, and those which demand increased attention.

### ORGANIZATION OF THE INVENTORY

The report consists of profiles of the individual research projects being conducted by each Branch of the Ministry in the 1977-78 fiscal year, as they were identified by the Branches themselves. It includes in-house activity, as well as grants to Universities, contract research and projects supported by joint funding.

The inventory includes:

- (1) all projects conducted outside the Ministry, through Ministry of the Environment funding;
- (2) all research carried out by the Ministry's Branches where the annual budget of the projects were in excess of \$7,500 and/or one-quarter man-year.

It is outside the objectives of the inventory to include the routine test series and studies which implement on-going management programs.

FORMAT

The projects are grouped under their funding Branches. The profiles supply the following information:

<u>Branch</u>	Ministry branch responsible for the project and who should be contacted for further information.
<u>Project Title</u>	For identification and filing.
<u>Key Words</u>	The key words relating to each project are listed alphabetically in the Index at the back of the Inventory.
<u>Principal Investigator</u>	Contact for additional information on project.
<u>Liaison Officer Supervisor or/ Senior Ministry Official</u>	Responsible for the project.
<u>Research Category</u>	Identifies whether work is done in Ministry (internal) or outside (grant or a solicited or unsolicited contract) and if project is multi-year and if concurrent to a second related project.
<u>Objective</u>	Immediate reasons for undertaking the project.
<u>Description</u>	Details of the projects focuses on the methodology employed and indicates the exact nature of the research to persons with expertise in the field. Where a set of projects have been grouped under one title, the individual projects receive separate treatment under the "Description" heading and thereafter.
<u>Duration of Project in Years</u>	Starting and Completion Dates.
<u>Budget</u>	Current year total dollars and man years for the project. These are estimates only.
<u>Source of Funds</u>	Projects in the regular work program are funded out of normal branch budgets, those in the special category use funds set up particularly for the project and are identifiable in the Ministry budget. Most of the jointly funded projects are federal-provincial programs such as those of the International Joint Commission and the Canada/Ontario Agreement.

Reporting  
Procedure

Whether there will be interim and/or final reports available; and when anticipated.

Participation by  
Other Ministries

This space indicates if the project is assisted from other Provincial Ministries by either funding, equipment or staff support.

Remarks

Special comments on the project not listed above are shown here.

The Research Advisory Committee (RAC) was created in 1975 to provide a broadly based co-ordinating and planning group for the Ministry's research program. The committee is made up of representatives of the various Ministry Branches who have research responsibilities plus a member from the Program Planning & Evaluation Branch, a representative from the Regional Offices and a medical advisor from the Ministry of Labour.

The Research Advisory Committee is also responsible for the administration of the Provincial Lottery Funds which are available for health oriented environmental projects. Nine projects were funded in 1977/78 amounting to \$1.074 million. Five of these projects were research oriented and are included in this summary. One of the responsibilities of the RAC is the annual publication of the Inventory of Research Projects.

BREAKDOWN OF THE 140 RESEARCH PROJECTS  
FOR F.Y. 1977/78 ACCORDING TO TIME DURATION

<u>Time Duration of the Project in Years</u>	<u>Expected Completion of the Project Fiscal Year</u>	<u>Number of Projects</u>	<u>% of Total Projects</u>
1	77/78	36	25
2	77/78	19	14
	78/79	12	9
3	77/78	3	2
	78/79	9	6
	79/80	15	11
4	78/79	4	3
	79/80	1	1
	80/81	7	5
5	79/80	4	3
	80/81	1	1
	81/82	5	3
6	80/81 and beyond	3	2
Ongoing Projects	79/80	3	2
	80/81 and beyond	18	13
Total *		140	100
* Projects conducted within Ministry of the Environment Facilities		85	
Projects conducted by Outside Contract at Universities or Consultants		55	

Air Resources Branch

Support of General Research Activities	AR-1
The Effect of Stream Turbulence on S-Type Pitot Tube Calibrations	AR-2
High Resolution Spectroscopic Studies on Daylight and Atmospheric Absorption Over the Toronto Region with Specific Application to the Elucidation of the Brown Atmospheric Haze	AR-3
Environmental Control Aspects of Flaring	AR-4
Grape Responses to Oxidant Smog in Southwestern Ontario	AR-5
Multiple Applications of the Trace Atmospheric Gas Analyzer (TAGA) System to Air Quality Measurements	AR-6
Assessment of Yield Losses Due to Ozone and Botrytis in Onions	AR-7
SO <sub>2</sub> Pollution Abatement Through Electrochemical Processes Which Also Generate Electrical Energy	AR-8
Road Dust Collected on Air Filters	AR-9
The Study of Particulate Pollution in the Hamilton-Nanticoke Region	AR-10
Point Monitoring System for Gaseous Pollutants by the Infrared Resonance Absorption Technique Using Tunable Semiconductor Diode Gasers	AR-11
Trace Analysis of Compounds on Airborne Particulate Matter and Other Environmental Contaminants	AR-12
Completion of an Experimental Investigation of Gas Atomized Spray Scrubbers	AR-13
A Review of the State of Technology Pertaining to Continuous Particulate Monitoring	AR-14
An Investigation into the Measurement of Industrial Odours Associated with Aerosols and Vapours	AR-15
Atmospheric Reactions of Polynuclear Aromatic Hydrocarbons - Identification and Quantification of Oxygenated Species	AR-16
In Situ Electrostatic Precipitation or Confinement or Particulate Emissions from Industrial Processes	AR-17

Laboratory Services Branch

Analytical Methods Development for the Detection and Quantitation of Mutagenic Activity in Environmental Samples	LS-1
Organics in The St. Clair River System	LS-2
An Analytical Procedure for Organic Carbon in Waters Which May or May Not Contain Suspended Matter	LS-3
Evaluation of Technicon Automated Kjeldahl Digestor	LS-4
Asbestos Sample Stability and Accuracy of the Interim Method for the Determination of Asbestos Fibre Concentrations in Water by Transmission Electron Microscopy	LS-5
Development of an Interim Method for the Determination of Asbestos Fibres in Air by Transmission Electron Microscopy	LS-6
Taxonomy of Aquatic Heterotrophic Bacteria	LS-7
Enterobacteriaceae Isolated from Municipal Distribution Systems by the Presence Absence (P-A) Test	LS-8
Epidemiology of <u>Otitis Externa</u> Cause by <u>P. aeruginosa</u> Among Swimmers in Recreational Lakes	LS-9
Determination of Heterotrophic Bacteria in Recreational Lakes	LS-10
Occurrence of Pathogenic Bacteria in Recreational Lakes	LS-11
Analysis of Nickel in Blood and Urine by Flameless Atomic Absorption Spectroscopy	LS-12
Development of an Interim Method for the Determination of Asbestos Fibres in Water by Transmission Electron Microscopy	LS-13
Analysis of Organophosphate and Carbamate Insecticides in Bark	LS-14
Determination of Organochlorine and Organosulphur Compounds in Industrial Wastes to be Incinerated	LS-15
Use of Automated Clean-up System for PCB Analysis in Fish	LS-16
Perchlorination of Polychlorinated Biphenyls	LS-17
PCB Analysis in Ambient Air	LS-18
PCB Formation in Sewage Chlorination	LS-19



Pesticides Advisory Committee

The Responses of Bacteria, Algae, and Invertebrates in Small Ponds to Applications of Mosquito Larvicides	PAC-1
Activity and Persistence of Some Organophosphorus, Carbamate, and Pyrethroid Insecticides in Soil	PAC-2
Further Development of Analytical Method for Benomyl Residues in Agricultural Commodities and Studies on the Persistence of Benomyl after Spray Application in the Environment	PAC-3
Bioaccumulation Potential of Pyrethroid Insecticides in Terrestrial and Aquatic Food Chains	PAC-4
The Behavioral Effects of Sublethal Doses of 2, 4 D Butoxyethanol, Glyphosate, Diquat, Simazine and Atrazine on the Rheotropic Response of Rainbow Trout	PAC-5
Economic Threshold of Cereal Leaf Beetle <i>Oulema melanopus</i> (L) on Oats and Barley in Ontario	PAC-6
Control of Dark Sided Cutworm, <i>Euxoa messoria</i> (Harris) in Southwestern Ontario Tobacco Fields with Permethrin Insecticide	PAC-7
Reduction of Fungicide Usage on Vegetable Crops by Timing Fungicide Applications According to Weather Data	PAC-8
Research on the Control of Biting Flies, Especially Mosquitoes in Ontario	PAC-9
Electrostatic Application of Pesticides in Orchards and Field Crops	PAC-10
Effects of Insect Growth Regulators on Emergence of Black Fly Larvae and on Non-target Aquatic Invertebrates	PAC-11
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The Chemical Synthesis of Candidate Sex Attractants for the Apple Maggot	PAC-13
Herbicide Residues in Organic Soils Following the Use of Linuron and Chlorbromuron	PAC-14
Control of the Onion Maggot, <i>Hylemya antiqua</i> (Meigen) by Use of the Sterile Male Technique	PAC-15
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Neuro Muscular Function on Persons Exposed to Organophosphorous Pesticides Compared with an Unexposed Group	PAC-17
Feasibility of Using the Litterbag Technique as an Index of the Environmental Impact of Soil Insecticides on the Soil Fauna	PAC-18
The Effects of Pyrethroid Insecticides on Soil Micro-organisms and Their Activities on Soil	PAC-19

#### Pollution Control Branch

Underground Movement of Contaminants	PC-1
IJC-PLUARG Study of Septic Tank Discharges	PC-2
Sand Filtration of Septic Tank Effluent	PC-3
Raised Tile Field	PC-4
Water Main Insulation	PC-5
Large Scale Tile Field	PC-6
Distribution System Survey	PC-7
Distribution System - Small Animal Survey	PC-8
Parasites in Sewage Sludges	PC-9
Chlorinated Organic Formation and Reduction Drinking Water Treatment	PC-10
Ozonation of Potable Water Supplies	PC-11
Asbestos in Drinking Water Supplies	PC-12
Flotation	PC-13
Asbestos Removal from Potable Water	PC-14
Manganese Sequestration	PC-15
Biological Nitrification Process Evaluation	PC-16
Nitrification of Sewage Treatment Plant Effluents	PC-17
Mixing in Anaerobic Digesters	PC-18
Aerated Lagoon Evaluation	PC-19
Investigation of a U-Flume for In-Sewer Flow Measurement	PC-20

Assessment of Municipal Bypass Flow	PC-21
Users Manual for Flow Monitoring Techniques	PC-22
Sewage Effluent Disinfection with Chlorine	PC-23
Effluent Disinfection	PC-24

#### Water Resources

Bio-accumulation Rates, Acute and Chronic Effects of Five New Dielectric Fluids on American Flagfish	PL-1
Detection, Enumeration and Interpretation of Levels of Virus in Drinking Water & Bathing Waters	PL-2
An Investigation of the Environmental Health Hazards Associated With Road Oiling	PL-3
The Spread of St. Louis Encephalitis Through Avian and Rodent Reservoirs	PL-4
Chloroform Reduction Investigation Program at Belleville Utilities Commission	PL-5

Resource Recovery Branch

Energy Considerations for Multiple-Hearth and Fluidized Bed Sludge Incineration	RR-1
Innovative Refuse Collection Pilot Study	RR-2
Use of Refuse Derived Fuel in Cement Kilns	RR-3
Modelling Regional Solid Waste Management Systems	RR-4
Mixed Office Waste Paper Study in Federal and Provincial Buildings in Toronto	RR-5
Use of Waste Cellulose Fibre as Loose Fill Insulation	RR-6
Experimental Plant for Resource Recovery	RR-7

Waste Management Advisory Board

Urban Solid Waste Generation in Ontario - Report No. 2 of the Waste Indices Subcommittee	WMAB-1
An Evaluation of the Employment Impacts for Seven Policy Alternatives	WMAB-2
Non-Carbonated Soft Drink Packaging in Ontario	WMAB-3
Environmental Impact Study of Fluid Milk Containers	WMAB-4
Wine and Spirits Packaging in Ontario	WMAB-5
Development of Environmental Guidelines for Packaging of Consumer Products	WMAB-6
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Identification and Selection of Package Systems Suited to Standard Re-usable Applications	WMAB-8
Home Composting Program	WMAB-9

Water Resources Branch

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Batchawana Bay	WR-3
Thunder Bay	WR-4
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Pollution from Land Use Activities Reference Group IJC Task C Studies (PLUARG)	WR-37
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Mapping of Major Aquifers in Ontario	WR-39
Application of Geophysical Techniques to Ground Water Studies	WR-40

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Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE:

"Support of General Research Activities"

KEY WORDS:

Sulphur, reactions, acidification

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. J.B. Hyne - Alberta Sulphur Research Ltd.

LIAISON OFFICER

OR SUPERVISOR Mr. T.W. Cross, Assistant Director, Air Resources Branch

RESEARCH

INTERNAL ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☒

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To conduct general research into all aspects of sulphur and compounds.

DESCRIPTION:

1. sulphur forming; microscopic studies of internal structure; rates of phase changes
2. sulphur corrosion of receptors
3. sulphidation and desulphidation; reactions of  $H_2S$

DURATION  
OF PROJECT

4 YEARS

PRESENT  
YEAR IS

4 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$10,000

\$3,000

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK PROGRAM

SPECIAL  
MINISTRY FUNDING

JOINTLY  
FUNDED PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources Branch

DATE: May 17, 1977

PROJECT TITLE:

"The Effect of Stream Turbulence on S-Type Pitot Tube Calibrations"

KEY WORDS:

S-type Pitot tube, calibration, turbulence

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. C.K. Rush-Dept. of Mech. Engr., Queen's University

LIAISON OFFICER

OR SUPERVISOR Mr. D. Mozzon, Head, Source Assessment, T,D.A.

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CATEGORY:

GRANT X

SOLICITED CONTRACT —

CONCURRENT PROJECT —

OBJECTIVE:

To investigate the effect of different levels of stream turbulence as a possible explanation of differences in calibration values obtained in different wind tunnels.

DESCRIPTION:

Proposed to install an S-type Pitot Tube in a Diffuser Test Rig. Test Rig permits variable speed flows so that a range of Reynolds numbers can be covered. The stream turbulence level would be measured and by placing meshes of various sizes upstream of the measuring station, the turbulence level would be varied. A program of tests would be conducted on these ranges and the effects of turbulence on calibration estimated.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$3,200	\$3,200			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					
No					

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE: "High Resolution Spectroscopic Studies on Daylight and Atmospheric Absorption Over the Toronto Region with Specific Application to the Elucidation of the brown atmospheric haze"

KEY WORDS:  
atmospheric absorption, nitrogen dioxide, spectroscopic studies, brown haze

PRINCIPLE INVESTIGATOR Prof. R.W. Nicholls, Centre for Research Experimental  
AND AFFILIATION Space Science, York University

LIAISON OFFICER

T.D.A

OR SUPERVISOR Dr. S. Stevens, Head, Special Studies & Program Planning Unit,

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ CONCURRENT PROJECT ☐

OBJECTIVE:

1. to make high resolution spectroscopic observations of the absorption properties of the atmosphere, particularly of nitrogen dioxide
2. to elucidate the cause of the "Brown Haze".

DESCRIPTION:

To firmly establish the daylight spectrum over Toronto to identify absorption features and their strengths with the objective of determining the cause of the coloured haze. Computer simulations of atmospheric absorption spectra will be used as required.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>3rd</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$44,150	\$13,550			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					
No.					
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE:

"Environmental Control Aspects of Flaring"

KEY WORDS:

hydrocarbon flares

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. T.A. Brzustowski, University of Waterloo

LIAISON OFFICER

OR SUPERVISOR Mr. E.T. Barrow, Head, New Tech. & Process Evaluation

RESEARCH

INTERNAL ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☒

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

1. To measure the temperature and composition fields in laboratory-scale model flares in a wind-tunnel.
2. To develop useful finite-difference techniques for numerical modelling of flames on elevated flares.
3. To extend the applicant's top hat model of turbulent diffusion flames in a crosswind. (continued at the back please)

DESCRIPTION:

a crosswind. (continued at the back please)

DURATION  
OF PROJECT

5 YEARS

PRESENT  
YEAR IS

5th YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

\$57,000

\$14,000

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

Objectives continued:

4. To study the phenomena occurring inside the flare tip at low values of the ratio of discharge velocity to wind speed in order to establish the requirements for the minimum purging rate.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE:

"Grape Responses to Oxidant Smog in Southwestern Ontario"

KEY WORDS:

Ozone, grapes

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Dr. D.P. Ormrod, University of Guelph

LIAISON OFFICER

OR SUPERVISOR

Dr. S. Linzon, Phytotoxicology Section

RESEARCH

CATEGORY:

INTERNAL —

GRANT X

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT X

CONCURRENT PROJECT —

OBJECTIVE:

1. to conduct an intensive survey of smog ( $O_3$ ) damage to grapes in SW Ontario throughout 1977 growing season
2. to determine the relative sensitivities of grape cultivars to  $O_3$  under field conditions in SW Ontario
3. to evaluate the efficacy of certain chemical protectants in the protection of grape foliage from  $O_3$  damage in SW Ontario.

DESCRIPTION:

Growing season research would include at least one detailed inspection of commercial and experimental vineyards in Essex and Kent counties for ozone injury. Relative cultivar sensitivity will be determined wherever possible. Up to four vineyards will be studied intensively. Ozone damage will be related to day-to-day  $O_3$  or oxidant concentrations recorded at Windsor or Harrow. Air monitoring will be supplemented with portable MAST meters at each of up to 4 vineyards.

✓ Chemical protectant treatments would include foliar sprays and possibly soil drenches of promising chemicals. Protectants will include a fungicide, an anti-oxidant and of growth regulator. Emphasis will be placed on finding a protectant which has no deleterious effects on vine growth, and inexpensive and have a long-lasting effects. Protections experiments will be carried out at the four intensively studied vineyards.

DURATION  
OF PROJECT

2 YEARS

PRESENT  
YEAR IS

2nd YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

\$12,300

\$6,800

SOURCE OF  
FUNDS:

REGULAR  
WORK X  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



Ministry of the  
Environment

Ontario

AR #6

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE: "Multiple Applications of the Trace Atmospheric Gas Analyser (TAGA) System to Air Quality Measurements"

KEY WORDS:

Trace Air Analysis, TAGA, Analyser

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. J.B. French, Institute of Aerospace Studies, U of T.

LIAISON OFFICER

OR SUPERVISOR

Dr. S. Stevens, Head, Special Studies & Programme Planning Unit

RESEARCH

CATEGORY:

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT X

CONCURRENT PROJECT

OBJECTIVE:

To apply a novel instrument developed at UTIAS to the measurement of trace atmospheric components with particular reference to hazardous materials.

DESCRIPTION:

Using the "Trace Atmospheric Gas Analyser" (TAGA), real time monitoring of selected hazardous materials, such as PAH's PCB's, nitro amines, will be attempted.

DURATION  
OF PROJECT

3 YEARS

PRESENT

YEAR IS

3rd YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

\$41,115

\$15,750

SOURCE OF  
FUNDS:

REGULAR

WORK

PROGRAM

X

SPECIAL

MINISTRY

FUNDING

JOINTLY

FUNDED

PROJECT

OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE:

"Assessment of Yield Losses Due to Ozone and Botrytis in Onions"

KEY WORDS:

Ozone, botrytis, onion

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Dr. G. Hofstra, Dept. of Envl. Biology, Univ. of Guelph

LIAISON OFFICER

OR SUPERVISOR

Dr. S. Linzon, Supervisor, Phytotoxicology Section

RESEARCH

CATEGORY:

INTERNAL     

GRANT   x  

UNSOLICITED CONTRACT     

SOLICITED CONTRACT     

MULTI-YEAR PROJECT   x  

CONCURRENT PROJECT     

OBJECTIVE:

1. To determine the amount of yield reduction that can be attributed to ozone or to Botrytis in Bradford and Thedford, Ontario.
2. To determine the relative sensitivity of commercial onion cultivars.
3. To develop dose-response relationships for ozone and onion injury.

DESCRIPTION:

The research will be conducted in the Bradford and Thedford marshes. At each location, three cultivars will be treated with selected fungicides anti-oxidants and combinations of the two types of chemicals. Resistant and susceptible cultivars also will be planted in open-top air exclusion chambers and obscured for symptom development. The plot size will be greatly increased to obtain more meaningful estimates of yield reductions.

DURATION  
OF PROJECT

  4   YEARS

PRESENT  
YEAR IS

  4th   YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$37,808

CURRENT YEAR  
\$12,658

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR   x    
WORK       
PROGRAM

SPECIAL  
MINISTRY       
FUNDING

JOINTLY  
FUNDED      OTHER       
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE: "SO<sub>2</sub> Pollution Abatement Through Electrochemical Processes  
Which Also Generate Electrical Energy"

KEY WORDS:

SO<sub>2</sub> - anodic oxidation-fuel cell

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. G.A. Rubin, Dept. of Physics, Laurentian University

LIAISON OFFICER

OR SUPERVISOR Mr. E.T. Barrow, Head, New Technology & Process Evaluation

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CATEGORY:

GRANT ☒

SOLICITED CONTRACT —

CONCURRENT PROJECT —

OBJECTIVE:

1. to investigate feasibility of controlling SO<sub>2</sub> emissions by anodic oxidation of SO<sub>2</sub> to sulfuric acid in a fuel cell which generates electrical energy
2. to investigate feasibility of adding fuel cell-stage (metal sulfide fuel cell) to known hydrometallurgical processes such that sulfur from ore is precipitated in the solid state.

DESCRIPTION:

1. study of the reversibility of SO<sub>2</sub> adsorption in charcoal towers
2. study of the recovery rate of the catalyst as function of throughput and temperature
3. study of possible poisoning of the charcoal due to dust, traces of heavy metals, as a function of throughput
4. study of cathode reaction efficiency as function of SO<sub>2</sub> throughput & temp.
5. study of the performance of the graphite cathode in the metal-sulfide fuel cell in the presence of chlorine
6. study of the effect of temperature on the anodic oxidation  $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+}$  in the metal sulfide fuel cell.

DURATION  
OF PROJECT

1 ——— YEARS

PRESENT  
YEAR IS

1 ——— YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$15,360

\$15,360

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED —  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE:

"Road Dust Collected on Air Filters"

KEY WORDS:

road dust - air filters

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Prof. K. Fritze - Dept. of Chemistry, McMaster University

LIAISON OFFICER

OR SUPERVISOR

Dr. S. Stevens, Head, Special Studies & Programme Plng. Unit

RESEARCH

CATEGORY:

INTERNAL —

GRANT x

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To determine the relative contributions of road dust and industrial fall-out in particulate matter collected on air filters.

DESCRIPTION:

A mathematical model has been developed to solve the above problem. With actual measurements, it is suggested that the road dust be chemically labelled and the material collected on air filters is to be analysed for the label and its concentration should give a measure of the road dust contribution to the total dustfall and airborne particulate matter. This would allow the calculation of the industrial fall out contribution.

DURATION  
OF PROJECT

1

YEARS

PRESENT  
YEAR IS

1st

YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$16,800

\$16,800

SOURCE OF  
FUNDS:

REGULAR  
WORK x  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED —  
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE:

"The Study of Particulate Pollution in the Hamilton-Nanticoke Region"

KEY WORDS:

Particulate-Aerosol-Source-Nanticoke

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. L.D. Pengelly, Dept. of Medicine, McMaster University

LIAISON OFFICER

OR SUPERVISOR Dr. S. Stevens, Head, Special Studies & Programme Plng. Unit

RESEARCH

INTERNAL     
GRANT   X  

UNSOLICITED CONTRACT   

MULTI-YEAR PROJECT   X  

CATEGORY:

SOLICITED CONTRACT   

CONCURRENT PROJECT   

OBJECTIVE:

Identify and explore the nature and distribution of suspended particulates in this region and quantify and substantiate the findings. Specifically measure: 1) near-ground total atmospheric loading, 2) particle size distribution, 3) chemical composition, 4) effect of atmospheric conditions on TSP, PSD, chemical composition, 5) seasonal and long term trends.

DESCRIPTION:

The work programme consists of operating the monitoring network on a 6-day cycle, conducting supplementary measurements of TSP and PSD in important areas at selected times, analysing the chemical composition of selected samples, summarizing findings through statistical and numerical interpretation.

DURATION  
OF PROJECT

  3   YEARS

PRESENT  
YEAR IS

  3rd   YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

\$44,000

\$15,000

SOURCE OF  
FUNDS:

REGULAR

SPECIAL

JOINTLY

WORK   X  

MINISTRY   

FUNDED   

OTHER   

PROGRAM

FUNDING

PROJECT

IS A REPORT ANTICIPATED?

  Yes  

PARTICIPATION BY OTHER MINISTRIES:

  No  

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE: "Point Monitoring System for Gaseous Pollutants by the Infrared Resonance Absorption Technique Using Tunable Semiconductor Diode Gasers"

KEY WORDS: Gaseous pollutant, point monitoring, diode laser, IR Absorption

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. J. Shewchun, Dept. of Engineering Physics, McMaster Univ.

LIAISON OFFICER

OR SUPERVISOR Dr. S. Stevens, Head Special Studies & Programme Planning Unit

RESEARCH  
CATEGORY:

INTERNAL —  
GRANT X

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT —

MULTI-YEAR PROJECT X —  
CONCURRENT PROJECT —

OBJECTIVE:

To develop an economic point monitoring system for various gaseous pollutants based on the resonance infrared absorption technique using tunable diode lasers as radiation sources.

DESCRIPTION:

1. Infrared absorption measurements on several gases ( $O_3$ ,  $NO_x$ ,  $H_2S$ ,  $SO_2$ ) are to be carried out to determine relevant design parameters.
2. A prototype point monitoring system is constructed. The system uses an operational Pb Sn Se diode laser (3-20  $\mu$ ) as radiation source.  $SO_2$  will be concentrated on as the prototype pollutant.
3. GaInAs diode lasers, operating in the 1-3  $\mu$  range, have been developed for the system.
4. Future work will concentrate on making the detection limit more sensitive at .1 ppb and monitoring simultaneously other gases.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3rd YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
\$52,050

CURRENT YEAR  
\$20,000

TOTAL PROJECT

CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR X  
WORK PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED —  
PROJECT OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE: "Trace Analysis of Compounds on Airborne Particulate Matter and Other Environmental Contaminants"

KEY WORDS:

Organic trace contaminants, particulate matter, organic carcinogen

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. F.W. Karasek, Dept. of Chemistry, University of Waterloo

LIAISON OFFICER

OR SUPERVISOR

Dr. R.B. Caton, Special Studies & Programme Planning Unit

RESEARCH

INTERNAL

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —X

CATEGORY:

GRANT

X

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

1. to apply and refine our methods already developed utilizing high resolution gas chromatography with a digital GC, an interfaced GC/MS system, and computer programs to the trace analysis of organic compounds absorbed on airborne particulate matter from selected Ontario localities and produce qualitative and quantitative survey data on the compounds present.

(Continued at the back)

DESCRIPTION:

Work program includes completing improvement of present methods through application of glass capillary GC column technology, electron-capture detection, and use of GC/MS computer techniques.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2nd</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$66,500	\$50,000			
SOURCE OF FUNDS:	REGULAR <u>X</u> WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:	No				
REMARKS:					

OBJECTIVE - continued

2. to further increase the capability, speed, accuracy and sensitivity of these analytical methods by developing and expanding the techniques into new areas.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE:

"Completion of an Experimental Investigation of Gas Atomized Spray Scrubbers"

KEY WORDS:

Scrubbers, Atomisation, Efficiency design, Optimisation venturi

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. A.W. Gnyp, University of Windsor

LIAISON OFFICER

OR SUPERVISOR Mr. E.T. Barrow, Head, New Tech. & Process Evaluation Unit

RESEARCH

INTERNAL —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☒

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To develop design parameters that would optimise the performance of gas atomised spray scrubbers.

DESCRIPTION:

Completion of the overall program requires experimental determination of:

1. jet penetration length (to validate the jet penetration model)
2. liquid film flow rates as a function of throat velocity, jet penetration and liquor to gas ratio
3. liquid drop size distributions at initial jet desintegration and various axial locations in the Venturi
4. liquid injection techniques that can minimize film flow on the scrubber walls.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3rd YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$40,850

CURRENT YEAR  
\$9,050

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK PROGRAM

SPECIAL  
MINISTRY FUNDING

JOINTLY  
FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE: "A Review of the State of Technology Pertaining to Continuous Particulate Monitoring"

KEY WORDS: continuous particulate monitoring - literature review

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. A.W. Gnyp, Dept. of Chem Engr., University of Windsor

LIAISON OFFICER  
OR SUPERVISOR

Mr. D. Mozzon, Head, Source Assessment Unit

RESEARCH  
CATEGORY:

INTERNAL —  
GRANT ☒

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —  
CONCURRENT PROJECT —

OBJECTIVE:

To produce a systematic and comprehensive reference manual for use in Ministry of the Environment regional offices by individuals concerned with continuous particulate monitoring technology.

DESCRIPTION:

Publications to discuss:

1. Classes of continuous particulate monitors and principles of operation limitations.
2. Commercial models available and Canadian suppliers with prices.
3. Applications to specific sources.
4. Current users and evaluators in Canada and the US.
5. Maintenance and service requirements of monitors.
6. Potential developments and improvements in each class of monitors.

DURATION OF PROJECT 1 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE August 31, 1977

BUDGET: TOTAL DOLLARS MAN YEARS  
TOTAL PROJECT \$6,000 CURRENT YEAR \$6,000  
TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE: "An Investigation into the Measurement of Industrial Odours Associated with Aerosols and Vapours"

KEY WORDS: Odours, sampling, odour collection

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Prof. A.W. Gnyp, Dept. of Chem Engr., University of Windsor

LIAISON OFFICER  
OR SUPERVISOR Mr. Vlado Ozvacic, Source Assessment Unit

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

1. Design odour sampling procedures appropriate to industrial sources emitting odourous gases.
2. Evaluate the potential impact of adsorption, desorption and permeation phenomena on odour retention in conventional plastic storage bags using a fundamental approach based on a theoretical analysis of available literature related to these phenomena and field evaluations.

DESCRIPTION:

The program would include:

1. experimental investigations at typical industrial odour sources in Ontario. The field work would involve odour collection using conventional bags as well as concentrators based on absorption principles, storage and subsequent measurement
2. correlation of the experimental results with the theoretical analysis to provide a basic framework on which an Odour Sampling Code may eventually be developed.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$30,000	\$30,000			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					
No					
REMARKS:					





Ministry of the  
Environment

Ontario

AR- #16

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Air Resources

DATE: June 7, 1977

PROJECT TITLE: "Atmospheric Reactions of Polynuclear Aromatic Hydrocarbons - Identification and Quantification of Oxygenated Species"

KEY WORDS:

Polynuclear aromatic hydrocarbons, size fractionation, organic carcinogens

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. M. Katz, Centre for Research of Envl. Quality, York Univ.

LIAISON OFFICER

OR SUPERVISOR Dr. R.B. Caton, Special Studies & Programme Planning Unit

RESEARCH

INTERNAL X  
GRANT

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X  
SOLICITED CONTRACT — CONCURRENT PROJECT —

CATEGORY:

OBJECTIVE:

To analyse and identify various polynuclear aromatic hydrocarbons and their oxidation or decomposition products in airborne particulate matter at a number of locations in Ontario and to provide information on the seasonal distribution of PAH and variations in concentration attributable to the influence of major emission sources.

DESCRIPTION:

Size-fractionated samples of airborne particulate matter will continue to be collected by high-volume sampler fitted with Andersen cascade impactors and analysed for about 15 PAH species. Filters will be exposed near major industrial complexes and other suspected sources of PAH emissions. PAH's characteristic of atmospheric oxidation will be analysed to elucidate degradation mechanisms. Samples will be collected during all seasons of the year to assist in identifying sources of atmospheric PAH.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3rd YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

\$45,905

\$15,000

SOURCE OF  
FUNDS:

REGULAR  
WORK —  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED —  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Air Resources

DATE:

June 7, 1977

PROJECT TITLE: "In Situ Electrostatic Precipitation or Confinement of Particulate Emissions from Industrial Processes"

KEY WORDS:

electrostatic precipitation, airborne particulates, silicon carbide manufacture

PRINCIPLE INVESTIGATOR

AND AFFILIATION Prof. I.I. Inculet, Univ. of Western Ontario

LIAISON OFFICER

OR SUPERVISOR Mr. E.T. Barrow, Head, New Tech. & Process Eval. Unit

RESEARCH

INTERNAL ☐

UNSOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐

CATEGORY:

GRANT ☒

SOLICITED CONTRACT ☐

CONCURRENT PROJECT ☐

OBJECTIVE:

To study the feasibility of developing a corona injection electrode system for controlling emissions of particulate matter from plants producing silicon carbide.

DESCRIPTION:

A number of laboratory and field studies will be carried out to determine physical and aerodynamic properties of particle emitted from silicon carbide furnaces and to evaluate the feasibility of using the corona injection principle to -

1. change airborne particles in situ in the work place.
2. confine, precipitate back to ground or propel the particles to a collection system.

DURATION  
OF PROJECT

1 YEARS

PRESENT  
YEAR IS

1 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$10,000

CURRENT YEAR  
\$10,000

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

No

REMARKS:

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-1

BRANCH Laboratory Services

DATE December 2, 1977

PROJECT TITLE Analytical Methods Development for the Detection and Quantitation of Mutagenic Activity in Environmental Samples.

KEY WORDS Analyses, Methods, Mutagenic, Carcinogenic, 'Ames' test, Environment, Water, Effluents, Sediments, Concentration, Screening

PRINCIPAL INVESTIGATOR D. A. Rokosh, Ministry of the Environment  
AND AFFILIATION

LIAISON OFFICER J. A. Clark, L. T. Vlassoff  
OR SUPERVISOR

RESEARCH  
CATEGORY

INTERNAL  
GRANT

UNSOLICITED  
SOLICITED

MULTI-YEAR  
CONCURRENT

OBJECTIVE

Bacteriological and mycological (yeast) mutagenesis assays will be modified for use on environmental samples. The detection limits of these assays will be determined. Methods for concentration of mutagenic substances from samples containing levels  $>1$  ug/ml will be developed. Screening techniques for mutagenic activity will be developed to lower time and cost of analyses.

DESCRIPTION

Approximately 500 samples, including effluents, waters and sediments, originating from the St. Clair River and known to contain organic chemical pollutants, will be analysed by bacterial and yeast mutagenesis assays. The most suitable microbiological assay(s) will be selected. Assays for mutagenic screening and quantitative mutagenic activity will be developed. The detection limits of the assay will be determined by comparing mutagenic activity with the chemical composition of these samples. Methods for concentration of organic chemicals from these samples will be aimed at lowering the detection limits of these assays.

STARTING DATE March, 1978

COMPLETION DATE March, 1980

BUDGET 59,000  
CURRENT YEAR 24,000 plus 10,000 capital MAN YEARS 2.4

SOURCE OF  
FUNDS

REGULAR  
WORK  
PROGRAM     

SPECIAL  
MINISTRY  
FUNDING     

JOINTLY  
FUNDED  
PROJECT     

OTHER     

REPORTING  
PROCEDURE

Interim Report, Annual Report, Final Report, Methods Manual

REMARKS

The Organic Trace Contaminants and Pesticides Sections would be involved in methods development and chemical analyses.

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-2

BRANCH LABORATORY SERVICES, OTC SECTION DATE December , 1977

PROJECT TITLE Organics in The St. Clair River System

KEY WORDS trace organics, industrial effluents, mutagens, carcinogens,  
gas chromatography/mass spectrometry.

PRINCIPAL INVESTIGATOR R. D. Smillie, Project Scientist  
AND AFFILIATION T. Sakuma, Development Scientist, MS Lab

LIAISON OFFICER O. Meresz, Manager,  
OR SUPERVISOR OTC Section

RESEARCH CATEGORY	INTERNAL X GRANT	UNSOLICITED SOLICITED	MULTI-YEAR X CONCURRENT
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OBJECTIVE To isolate, identify and quantitate compounds representing  
potential environmental health hazards from industrial  
effluents discharged into the St. Clair River system and to  
evaluate these potential hazards.

DESCRIPTION Modern instrumental techniques such as GC, GC-MS, GC-IR,  
L.C. will be applied to isolate, identify and quantitate  
individual compounds. Samples will be prepared for  
toxicity tests by the Microbiology Section to identify  
fractions and/or individual compounds with potential  
mutagenic/carcinogenic properties and to determine their  
potential impact based upon data generated and data  
available in the literature. Recommendations will be  
made on permissible limits in industrial discharge.  
Details of predicted sample loads are attached.

STARTING DATE	May, 1977	COMPLETION DATE	September, 1979
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BUDGET CURRENT YEAR	Total \$135,000 \$45,000 (77/78)	MAN YEARS	3
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SOURCE OF FUNDS	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY <u>   </u> FUNDING	JOINTLY FUNDED <u>   </u> PROJECT	OTHER <u>   </u>
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REPORTING  
PROCEDURE Interim reports after 6 months, final report.

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-3

BRANCH Laboratory Services, Water Quality

DATE December, 1977

PROJECT TITLE AN ANALYTICAL PROCEDURE FOR ORGANIC CARBON IN WATERS WHICH  
MAY OR MAY NOT CONTAIN SUSPENDED MATTER.

KEY WORDS Organic carbon analysis, River, Wastewater, suspended solids

PRINCIPAL INVESTIGATOR J. Crowther  
AND AFFILIATION

LIAISON OFFICER S. Villard  
OR SUPERVISOR

RESEARCH CATEGORY	INTERNAL GRANT	<u>X</u>	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To develop an analytical procedure for organic carbon in water,  
wastes and sewage streams as well as assess present systems.

DESCRIPTION Although a number of carbon analyzers are available, none are  
suitable for high volume analyses of particulate carbon, and the  
reliability of results has not been sufficiently established.  
Available equipment will be evaluated with respect to  
a) scope of carbon analyses  
b) stability and rate of performance  
c) reliability of results

STARTING  
DATE May, 1974

COMPLETION  
DATE April 1, 1980

BUDGET  
CURRENT YEAR \$4,500

MAN YEARS 3

SOURCE OF FUNDS	REGULAR WORK PROGRAM	<u>X</u>	SPECIAL MINISTRY FUNDING	<u>    </u>	JOINTLY FUNDED PROJECT	<u>    </u>	OTHER	<u>    </u>
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REPORTING  
PROCEDURE Bi-monthly progress report  
Interim reports  
Final summary report

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-4

BRANCH Laboratory Services, Water Quality Section

DATE December, 1977

PROJECT TITLE EVALUATION OF TECHNICON AUTOMATED KJELDAHL DIGESTOR

KEY WORDS Automated Total Kjeldahl Nitrogen Digestor

PRINCIPAL INVESTIGATOR AND AFFILIATION Dr. Fred P. Dieken

LIAISON OFFICER OR SUPERVISOR Mr. S. Villard

RESEARCH CATEGORY	INTERNAL GRANT <input checked="" type="checkbox"/>	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To evaluate the Technicon Digestor for Total Kjeldahl Nitrogen Determination

DESCRIPTION Some laboratories report success in performing Total Kjeldahl Nitrogen analyses by automating the digestion procedure by using the Technicon Digestor. As this step is the rate determining factor in performing Kjeldahl Nitrogen analyses and the most costly in terms of manpower, automation of the digester process is highly desirable.

Using the automated digester, a Technicon channel will be utilised to analyze for Kjeldahl nitrogen. This system will be evaluated by comparing the recoveries with the present system (manual digestion). Both routine samples and pure chemicals will be analyzed

STARTING DATE October 15, 1975

COMPLETION DATE April 1, 1978

BUDGET CURRENT YEAR \$4,000

MAN YEARS 2½

SOURCE OF FUNDS	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
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REPORTING PROCEDURE Upon completion of interim reports

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH Laboratory ServicesDATE December, 1977PROJECT TITLE Asbestos Sample Stability and Accuracy of the Interim Method for the Determination of Asbestos Fibre Concentrations in Water by Transmission Electron Microscopy.KEY WORDS Asbestos, Chrysotile, Amphibole, Talc, Transmission Electron Microscopy, Low temperature ashing.PRINCIPAL INVESTIGATOR AND AFFILIATION T.W. Pang, Ontario Ministry of the EnvironmentLIAISON OFFICER OR SUPERVISOR A.C. Rayner, Manager, Physical Methods Section

RESEARCH CATEGORY	INTERNAL GRANT	X	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To test the Interim method with U.I.C.C. Chrysotile and Amphibole asbestos suspensions to determine:

- (a) percentage recovery of fibres
- (b) percentage recovery of fibres when the ashing procedure is incorporated
- (c) stability of the suspensions
- (d) recovery of fibres with and without an ashing procedure in the presence of potential interfering materials.

DESCRIPTION Artificial suspensions containing known amounts of chrysotile are prepared and filtered through appropriate filters at various time intervals. The filters are then analyzed with and without an ashing procedure. Artificial suspensions of chrysotile and talc are mixed and the suspensions filtered and analyzed.

Identical testing procedures are carried out using amphibole asbestos suspensions.

STARTING DATE Sept. 1977COMPLETION DATE April 1979BUDGET CURRENT YEAR \$16,200MAN YEARS 0.25

SOURCE OF FUNDS	REGULAR WORK PROGRAM	X	SPECIAL MINISTRY FUNDING	___	JOINTLY FUNDED PROJECT	___	OTHER	___
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REPORTING PROCEDURE Final Report

REMARKS



MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH Laboratory ServicesDATE December 1977

Development of an interim Method for the Determination of  
PROJECT TITLE Asbestos Fibres in Air by Transmission Electron Microscopy.

Asbestos, Chrysotile, Amphibole, Air Filters, Transmission Electron  
KEY WORDS microscope, Electron diffraction, low temperature ashing.

T.W. Pang, MOE, in association with Dr. E. Chatfield, ORF,  
PRINCIPAL INVESTIGATOR Dr. H. Cunningham and R. Pontefract, H & W.C. Dr. J. Kramer,  
AND AFFILIATION McMaster U., Dr. J. Mothersill, Lakehead, U., Dr. R. Lao,  
Environment Canada, Dr. J. Pimenta. MOE.

LIAISON OFFICER  
OR SUPERVISOR A.C. Rayner, Chairman - Ontario Ministry of the Environment.  
Committee on Asbestos Analysis.

RESEARCH	INTERNAL	UNSOLICITED	MULTI-YEAR
CATEGORY	GRANT	SOLICITED	CONCURRENT

OBJECTIVE (1) To investigate sampling methods used to isolate asbestos fibres from ambient air. (2) To develop a recommended method for the determination of asbestos in ambient air by transmission electron microscopy for use by Ontario analysts.

DESCRIPTION The adverse health effects of asbestos in air have been well documented. No agreement has been reached on the type of filter to be used to isolate the asbestos from air for analysis, nor has an analytical method been agreed upon for use by the various laboratories engaged in asbestos analysis. Testing of several different filter media, will be initiated and the filters will be analyzed by 5 Ontario Laboratories participating in the study, from samplers located at selected sites. Treatment of the exposed filters prior to electron microscopic examination and identification of fibres will be investigated, and a method recommended for adoption.

STARTING DATE Nov. 1976COMPLETION DATE March 1978BUDGET  
CURRENT YEAR \$10,500MAN YEARS 0.29

SOURCE OF FUNDS	REGULAR	SPECIAL	JOINTLY	OTHER
	WORK PROGRAM <u>X</u>	MINISTRY FUNDING <u>    </u>	FUNDED PROJECT <u>    </u>	

REPORTING PROCEDURE Final report

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH	Laboratory Services, Microbiology Section			DATE	December 1, 1977	
PROJECT TITLE	Taxonomy of Aquatic Heterotrophic Bacteria					
KEY WORDS	Taxonomy, Multiple Inoculation, Heterotroph					
PRINCIPAL INVESTIGATOR AND AFFILIATION	Jane E. Pagel					
LIAISON OFFICER OR SUPERVISOR	Jim Clark					
RESEARCH CATEGORY	INTERNAL GRANT	x	UNSOLICITED SOLICITED		MULTI-YEAR CONCURRENT	x
OBJECTIVE	To identify heterotrophic bacteria isolated from several recreational lakes with the aim of relating lakeshore development or population density to heterotrophs isolated. Also to develop multiple inoculation technique for the taxonomic studies.					
DESCRIPTION	<p>At present there is little knowledge on the makeup of heterotrophs in recreational lakes and its relation to lakeshore development. This study will help provide data on this subject and in so doing will develop multiple inoculation for routine taxonomic work and for future numerical taxonomy studies.</p> <p>Random selection of isolates from seven lakes. 342 picked in first survey, 381 in second survey. Isolates weaned from minimal salts medium at 20°C to nutrient medium at 30°C for testing.</p> <p>Three screening tests channel isolates into one of six taxonomic schemes. Multiple inoculation used for testing after arranging incubation conditions and test modifications.</p>					
STARTING DATE	1/10/76		COMPLETION DATE	1/3/78		
BUDGET CURRENT YEAR	11,000		MAN YEARS	1/2		
SOURCE OF FUNDS	REGULAR WORK PROGRAM	x	SPECIAL MINISTRY FUNDING	—	JOINTLY FUNDED PROJECT	—
					OTHER	x Lakeshore Capacity
REPORTING PROCEDURE	Possibly 2 publications 1) Heterotroph Taxonomy 2) Multiple Inoculator Development					

REMARKS



MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH	Laboratory - Microbiology		DATE	December 1, 1977	
PROJECT TITLE	Enterobacteriaceae isolated from municipal distribution systems by the Presence Absence (P-A) test.				
KEY WORDS	Enterobacteriaceae, bacterial analysis, distribution systems				
PRINCIPAL INVESTIGATOR AND AFFILIATION	J.A. Clark				
LIAISON OFFICER OR SUPERVISOR	L.T. Vlassoff				
RESEARCH CATEGORY	INTERNAL GRANT <input checked="" type="checkbox"/>	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT <input checked="" type="checkbox"/>		
OBJECTIVE	To characterize and identify bacterial cultures of the Enterobacteriaceae isolated from municipal distribution systems by the Presence-Absence (P-A) test.				
DESCRIPTION	<p>Since not all members of the Enterobacteriaceae arise from animal digestive tracts, separating and identifying individual members of the group would be useful for characterizing municipal water systems with respect to which of these bacteria are resident or transient organisms in the distribution system.</p> <p>Bacterial cultures were inoculated into Enterotubes which permitted preliminary identification of certain bacterial types into groups, and final identification of others into genera and/or species of the Enterobacteriaceae. The frequency patterns of the various isolates from individual municipalities will be determined.</p>				
STARTING DATE	1974		COMPLETION DATE	Dec. 78	
BUDGET CURRENT YEAR	7,500		MAN YEARS	1/3	
SOURCE OF FUNDS	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	
REPORTING PROCEDURE	1) Internal Report				
REMARKS					

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE L6-9

BRANCH Laboratory Services

DATE December 1, 1977

PROJECT TITLE Epidemiology of Otitis Externa cause by P. aeruginosa among swimmers in Recreational Lakes.

KEY WORDS Otitis-Externa, swimmers ear, lakes. P. aeruginosa

PRINCIPAL INVESTIGATOR Dr. G.S. Hendry  
AND AFFILIATION Mr. K.P.Lautenschlager

LIAISON OFFICER Mr. A. Burger  
OR SUPERVISOR

RESEARCH CATEGORY	INTERNAL <input checked="" type="checkbox"/> GRANT	UNSOLICITED SOLICITED	MULTI-YEAR <input checked="" type="checkbox"/> CONCURRENT
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OBJECTIVE To improve the technology of water quality assessment by developing a new bacterial parameter of Recreational water quality. The first step will be the proof that P. aeruginosa can be transferred from water to the ears of swimmers.

DESCRIPTION See the following literature:-

1. Norma Duncan et.al. Preparation of typing antisera for O antigens of Pseudomonas aeruginosa. J. CLIN. MICROBIOL. 2:124-128 (1976).
2. A. Hoadley, D. Knight. External Otitis among swimmers and non-swimmers ARCH. ENVIRON. HEALTH 30:445-448 (1975).
3. P.L. Seyfried et.al. Pseudomonas aeruginosa in Recreational Water Related to the incidence of Otitis Externa Infection - IN PRESS (1977). The study will be first carried out with cottagers on Gravenhurst Bay and children at a swimming class on Gull Lake in Gravenhurst. P. aeruginosa isolated from water and ears of swimmers will be typed by antisera and phage. The transfer of identical strains from water to the ears of swimmers will be demonstrated.

STARTING DATE 1977

COMPLETION DATE 1979

BUDGET CURRENT YEAR 46,700

MAN YEARS 2

SOURCE OF FUNDS	REGULAR WORK PROGRAM <input type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input checked="" type="checkbox"/> Lakeshore Capacity
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REPORTING PROCEDURE A summary report will be made to the steering committee. A final report will be made in 1979

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH	Laboratory Services			DATE	December 1, 1977	
PROJECT TITLE	Determination of Heterotrophic Bacteria in Recreational Lakes					
KEY WORDS	Heterotroph, Lakes, Trophic Status					
PRINCIPAL INVESTIGATOR AND AFFILIATION	Dr. G.S. Hendry Mr. K.P. Lautenschlager					
LIAISON OFFICER OR SUPERVISOR	Mr. A. Burger					
RESEARCH CATEGORY	INTERNAL GRANT	<input checked="" type="checkbox"/> x	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT	<input checked="" type="checkbox"/> x	
OBJECTIVE	To determine the number of heterotrophic bacteria in Recreational lakes and to relate these numbers to various chemical and biological parameters of water quality					
DESCRIPTION	<p>See previous internal report.</p> <p>G.S. Hendry 1976. Density of Heterotrophic Bacteria in Muskoka Recreational Lakes</p> <p>The bacteria will be cultured on 'Heterotrophic Agar' (Foot and Taylor agar with 3.0 g peptone). Various chemical parameters will be measured (e.g. Chl<sub>a</sub>, TOC, KN etc). Other agar media may be tested. Lakes with varied trophic status in the District of Muskoka will be surveyed. A related project, carried out by Jane Pagel (510-R02), will determine the genera of the bacteria isolated on the heterotroph medium.</p>					
STARTING DATE	1976		COMPLETION DATE	1979		
BUDGET CURRENT YEAR	11,000		MAN YEARS	1/3		
SOURCE OF FUNDS	REGULAR WORK PROGRAM	<input type="checkbox"/> —	SPECIAL MINISTRY FUNDING	<input type="checkbox"/> —	JOINTLY FUNDED PROJECT	<input type="checkbox"/> —
				OTHER	<input checked="" type="checkbox"/> x Lakeshore Capacity	
REPORTING PROCEDURE	A summary report is made yearly to the Steering Committee. A final report will be made in 1979.					
REMARKS						

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-11

BRANCH Laboratory Services Branch

DATE December 1, 1977

PROJECT TITLE Occurrence of pathogenic bacteria in Recreational Lakes

KEY WORDS Pathogenic Bacteria, water quality criteria, lakeshore development

PRINCIPAL INVESTIGATOR Dr. G.S. Hendry  
AND AFFILIATION Mr. K. Lautenschlager

LIAISON OFFICER  
OR SUPERVISOR Mr. A. Burger

RESEARCH  
CATEGORY

INTERNAL  
GRANT

x

UNSOLICITED  
SOLICITED

MULTI-YEAR  
CONCURRENT

x

OBJECTIVE

To determine levels of pathogenic bacteria (eg. P. aeruginosa, Salmonella, Yersinia enterocolytica) in Recreational lakes and to model these values with other lake characteristics (e.g. Trophic status and level of developments)

DESCRIPTION

New criteria of Recreational Water Quality may be developed from these studies. Present criteria need to be reviewed. (The Development of Criteria for Recreational Waters - Cabelli et al Int. Sym. on Dis. Sew: 1974. A critical examination of bathing water quality standards - Foster et al JWPCF 43:2229-2241)  
New data will be collected from water and sediment of a few carefully chosen lakes in Muskoka - Haliburton. Several methods for the enumeration of each bacterium will have to be tested. Fecal coliforms at a point of reference are determined concurrently

STARTING  
DATE

1976

COMPLETION  
DATE

1979

BUDGET  
CURRENT YEAR

60,000

MAN YEARS 3

SOURCE OF  
FUNDS

REGULAR  
WORK  
PROGRAM       

SPECIAL  
MINISTRY  
FUNDING       

JOINTLY  
FUNDED  
PROJECT       

OTHER x Lakeshore  
Capacity

REPORTING  
PROCEDURE

A summary report is made yearly to the Steering Committee. A final report will be made in 1979

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH Laboratory Services, Air Quality

DATE December 21, 1977

PROJECT TITLE Analysis of Nickel in Blood and Urine by Flameless  
Atomic Absorption Spectroscopy

KEY WORDS Nickel, Blood, Urine, FAAS

PRINCIPAL INVESTIGATOR David Sturgis  
AND AFFILIATIONLIAISON OFFICER Dr. B.R. Loescher  
OR SUPERVISORRESEARCH  
CATEGORYINTERNAL ☒ X  
GRANTUNSOLICITED  
SOLICITEDMULTI-YEAR  
CONCURRENT

OBJECTIVE

To develop a method for the analysis of nickel in blood and urine and then survey workers in the Port Colborne area.

DESCRIPTION

Previous work has indicated that individuals in areas of high nickel exposure have elevated blood nickel levels but data is very limited and has not been related to human health effects.

1) Development of a reliable technique for the determination of nickel at sub ppb levels and application of this system to blood and urine samples.

2) Analysis of Port Colborne survey samples obtained by Ministry of Labour

STARTING  
DATE

December, 1977

COMPLETION  
DATE

December, 1978

BUDGET  
CURRENT YEAR

\$8000

MAN YEARS

0.4

SOURCE OF  
FUNDSREGULAR ☒ X  
WORK PROGRAMSPECIAL  
MINISTRY  
FUNDINGJOINTLY  
FUNDED  
PROJECT

OTHER

REPORTING  
PROCEDURE

Interministerial Report

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-13

BRANCH Laboratory Services

DATE December 1977

PROJECT TITLE Development of an interim Method for the Determination of Asbestos Fibres in water by Transmission Electron Microscopy.

KEY WORDS Asbestos, Chrysotile, Ampibole, Water Samples, Transmission Electron Microscopy, Electron diffraction.

PRINCIPAL INVESTIGATOR T.W. Pang, MOE, Members of the Ontario Ministry of the  
AND AFFILIATION Environment, Committee on Asbestos Analysis, 1976/77. Dr. E. Chatfield, ORF, Dr. H. Cunningham, H. & W.C. Dr. Durham C.C.I.W. Dr. J. Kramer, McMaster U. Dr. J. Mothersill, Lakehead U, Dr. J. Pimenta, M.O.E.  
LIAISON OFFICER Dr. R. Pontefract H & W.C. Dr. R. Lao (Env. Canada)  
OR SUPERVISOR Supervisor - Mr. A.C. Rayner, Committee Chairman M.O.E.

RESEARCH  
CATEGORY

INTERNAL  
GRANT

UNSOLICITED  
SOLICITED

MULTI-YEAR  
CONCURRENT

(1) To conduct inter-laboratory comparisons of selected methods for the determination of asbestos fibres in water and based on the results  
OBJECTIVE of this study to 2- develop a recommended interim method for the determination of asbestos fibres in water by transmission electron microscopy, for use by Ontario analysts.

DESCRIPTION Because of lack of a single accepted and tested method of analysis for asbestos, precise and comparable analytical data on the levels of asbestos in Ontario waters are not available. In the projected inter comparison studies, participating laboratories include Lakehead and McMaster Universities, the Ontario Research Foundation, Environment Canada, Health and Welfare Canada and the Ontario Ministry of the Environment. Samples of water from selected sites in Ontario will be analysed for asbestos content by all laboratories. Problems connected with the enumeration and identification of asbestos fibres will be investigated and a method recommended for adoption.

STARTING  
DATE April 1976

COMPLETION  
DATE January 1978

BUDGET  
CURRENT YEAR \$10,900

MAN YEARS 0.35

SOURCE OF FUNDS  
REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

REPORTING  
PROCEDURE Two Final Reports - First report issued Nov. 1977.

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-14

BRANCH Laboratory Services Branch, Pesticides. DATE Dec. 6, 1977  
PROJECT TITLE Analysis of Organophosphate and Carbamate Insecticides  
in Bark.

KEY WORDS

PRINCIPAL INVESTIGATOR P. Baulu  
AND AFFILIATION

LIAISON OFFICER G. A. V. Rees  
OR SUPERVISOR

RESEARCH CATEGORY	INTERNAL GRANT	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To develop an analytical procedure for analysis of bark  
for certain organophosphate and carbamate insecticides.

DESCRIPTION Since the Sawyer beetle causes great damage to log piles,  
a joint project was evolved including MOE, Environment  
Canada, logging companies and an insecticide manufacturer.  
The MOE Timmins office is involved in determining the  
environmental impact of the insecticides used and has  
requested that we perform the analyses. This involves the following steps:  
Develop analytical procedures for the extraction, clean-up of bark  
for analysis.  
Determine the optimum GC conditions for FPD analysis of fenitrothion  
and chlorpyrifos.  
Determine the best operating conditions for HPLC analysis of propoxur.

STARTING DATE	COMPLETION DATE
May, 1977	October, 1977

BUDGET CURRENT YEAR	MAN YEARS
\$7,000	0.50

SOURCE OF FUNDS	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
	<u>X</u>	___	___	___

REPORTING  
PROCEDURE One final report

REMARKS



MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-15

BRANCH Laboratory Services Branch

DATE May, 1977

PROJECT TITLE Determination of Organochlorine and Organosulphur Compounds in Industrial Wastes to be Incinerated.

KEY WORDS Organic chlorines, organic sulphur compounds, incineration analysis of, industrial wastes

PRINCIPAL INVESTIGATOR AND AFFILIATION O. W. Berg

LIAISON OFFICER OR SUPERVISOR G. A. V. Rees

RESEARCH CATEGORY	INTERNAL GRANT	X	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To determine the volatile sulphur and chlorine content in industrial wastes to be incinerated.

DESCRIPTION The Environmental Protection Act, 1971 establishes stack emission standards for SO<sub>2</sub> and HCl. The emission standards have been correlated with the volatile chlorine-and sulphur-compound concentrations in the feed. An apparatus will be developed that will simulate the thermal destruction of the chlorine and sulphur compounds in the incinerator. The reaction products, SO<sub>2</sub> and HCl will be determined quantitatively in terms of SO<sub>4</sub> and Cl by conventional means.

STARTING DATE	May, 1977	COMPLETION DATE	December, 1977.
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BUDGET CURRENT YEAR	\$6,500	MAN YEARS	0.30
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SOURCE OF FUNDS	REGULAR WORK PROGRAM	X	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
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REPORTING PROCEDURE Internal report. Publication at the Industrial Wastes Conference in 1978.

REMARKS



MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-16

BRANCH Lab Services Branch, Pesticides Section. DATE Dec. 6, 1977

PROJECT TITLE Use of Automated Clean-up System for PCB Analysis in Fish.

KEY WORDS

PRINCIPAL INVESTIGATOR Y. Jones  
AND AFFILIATION

LIAISON OFFICER G. A. V. Rees  
OR SUPERVISOR

RESEARCH  
CATEGORY

INTERNAL  
GRANT

UNSOLICITED  
SOLICITED

MULTI-YEAR  
CONCURRENT

OBJECTIVE

Evaluate an automated column chromatographic procedure for cleanup and separation of PCB's and organochlorinated pesticides in fish.

DESCRIPTION

Present time-consuming clean-up procedures do not supply the automated G.C. System with sufficient fish samples, thus it is imperative to devise an automated procedure able to provide a steady flow of cleaned-up samples for full use of the automated G.C. systems. Clean-up of fish samples involves removal of lipids and separation of PCB's from organochlorinated pesticides. Several columns for recovery and separation of PCB's and organochlorine compounds will be evaluated. The clean-up efficiency, that is the degree of separation of lipids from PCB's and organochlorinated pesticides, of each column will be assessed. Further work will involve automation of the system by the addition of a switching valve, an automatic sampler and fraction collector.

STARTING  
DATE

April/77

COMPLETION  
DATE

BUDGET  
CURRENT YEAR

\$7500.

MAN YEARS

0.50

SOURCE OF  
FUNDS

REGULAR  
WORK  
PROGRAM

SPECIAL  
MINISTRY  
FUNDING

JOINTLY  
FUNDED  
PROJECT

OTHER

REPORTING  
PROCEDURE

REMARKS

Column evaluation in progress for clean-up of fish samples April, 1977.

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

PAGE LS-17

BRANCH Laboratories

DATE February 24, 1977

PROJECT TITLE Perchlorination of Polychlorinated Biphenyls

KEY WORDS PCBs, perchlorination, analysis, decachloro biphenyl

PRINCIPAL INVESTIGATOR O. William Berg  
AND AFFILIATION

LIAISON OFFICER G. A. V. Rees  
OR SUPERVISOR

RESEARCH CATEGORY	INTERNAL GRANT	X	UNSOLICITED SOLICITED	MULTI-YEAR CONCURRENT
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OBJECTIVE To investigate the quantitative formation of decachloro biphenyl from a variety of environmentally occurring PCBs. This will make it possible to determine the PCBs in terms of a single, well-defined derivative - deacachloro biphenyl.

DESCRIPTION The two commercially available perchlorination reagents will be evaluated, Analabs Reagent A and B. Other perchlorination reagents, described in open literature, based primarily on antimony pentachloride, will be investigated as well. Many chlorination agents have been used for the perchlorination of aromatics in preparative terms. Many of these procedures do not define the temperature-time relationships in any detail. This relationship is important for a quantitative conversion, and consequently, it will be investigated in a systematic manner.

STARTING  
DATE February, 1977

COMPLETION  
DATE December, 1977

BUDGET  
CURRENT YEAR \$7500.

MAN YEARS 0.50

SOURCE OF FUNDS	REGULAR WORK PROGRAM	---	SPECIAL MINISTRY FUNDING	---	JOINTLY FUNDED PROJECT	---	OTHER	---
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REPORTING  
PROCEDURE A paper, entitled Simplified Techniques for the Perchlorination of Polychlorinated Biphenyls in Environmental Samples by Berg, Rees and Ali has been submitted, and accepted for publication at the 1978 Pittsburgh conference.

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH Laboratory Services

DATE February 22, 1977

PROJECT TITLE PCB Analysis in Ambient Air

KEY WORDS PCB, Air, Florisil

PRINCIPAL INVESTIGATOR AND AFFILIATION J. Osborne

LIAISON OFFICER OR SUPERVISOR G. A. V. Rees

RESEARCH  
CATEGORYINTERNAL  
GRANTUNSOLICITED  
SOLICITEDMULTI-YEAR  
CONCURRENT

OBJECTIVE To develop a simplified trapping system to monitor PCB levels in ambient air.

DESCRIPTION Ambient air sampling for trace organics analysis has been performed using liquid impingers, polymer adsorbents, and high volume filters. Impingers are cumbersome and difficult to analyze. Filters do not trap vapors. Polymers adsorbents are expensive and hard to clean. If an inorganic adsorbent such as florisil could be used, it would be cheap, easy to clean and disposable. The experimental program includes the following:

Design sampling cartridge (glass) and prefilter.  
Test Florisil in cartridge for: (1) Blank levels  
(2) Florisil rates  
(3) Efficiency of adsorption  
(4) Efficiency of elution  
(5) Effects of humidity, using an air sampling system,

carry out a sampling survey of ambient air levels of PCB prior to, during, and after a "burn" of waste PCB's at St. Lawrence Cement, in conjunction with Dr. E. Singer, Air Resources Branch.

STARTING  
DATE

April 1977

COMPLETION  
DATE

September 1977

BUDGET

CURRENT YEAR \$2,500 TOTAL \$10,000

MAN YEARS Current Year .50  
TotalSOURCE OF  
FUNDSREGULAR  
WORK X  
PROGRAMSPECIAL  
MINISTRY  
FUNDINGJOINTLY  
FUNDED  
PROJECT

OTHER

REPORTING  
PROCEDURE

Bimonthly progress reports - summary report

REMARKS

MINISTRY OF THE ENVIRONMENT  
RESEARCH AND DEVELOPMENT INVENTORY

BRANCH Laboratory Services

DATE Dec. 7/75

PROJECT TITLE PCB Formation in Sewage Chlorination

KEY WORDS PCB, Biphenyl, Chlorination, Sewage Treatment

PRINCIPAL INVESTIGATOR AND AFFILIATION Dr. O. W. Berg, MOE, Pesticides Section

LIAISON OFFICER OR SUPERVISOR Mr. G. A. V. Rees

RESEARCH CATEGORY	INTERNAL GRANT	X	UNSOLICITED SOLICITED	X	MULTI-YEAR CONCURRENT
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OBJECTIVE To investigate the potential for formation of lower chlorinated biphenyls (mono, di, tri chloro-) in sewage treatment plants through the chlorination of biphenyl originating from industrial discharges and other sources.

DESCRIPTION The formation of chlorinated biphenyls by treatment of biphenyl with aqueous chlorinating agents has been demonstrated under clean laboratory conditions. This project will determine whether similar reactions occur under routine STP chlorination conditons.

- (1) Detailed GC-MS analysis of PCB composition will be undertaken on sewage samples before and after chlorination on 5 STPs receiving biphenyl in waste discharges.
- (2) Biphenyl will be metered into an STP stream immediately prior to chlorination. Detailed GC-MS analyses will detect changes in amounts of lower chlorinated biphenyls.
- (3) Analytical studies will be performed to determine whether biphenyl can survive initial treatment processes sufficiently to reach the chlorination stage.
- (4) Examine the effect of other organics on the chlorination of biphenyls.

STARTING DATE May 1977

COMPLETION DATE December 1977

BUDGET CURRENT YEAR \$14,000

MAN YEARS 0.5

SOURCE OF FUNDS	REGULAR WORK PROGRAM	X	SPECIAL MINISTRY FUNDING	___	JOINTLY FUNDED PROJECT	___	OTHER	___
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REPORTING PROCEDURE A report is anticipated.

REMARKS Project will be carried out jointly with Mr. P. Foley, Research Coordinator, Pollution Control Branch. Immediate evaluation of this project is requested due to current legislative exposure of this issue.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: The responses of bacteria, algae, and invertebrates in  
small ponds to applications of mosquito larvicides

KEY WORDS: mosquito larvicides in small ponds

PRINCIPLE INVESTIGATOR  
AND AFFILIATION M. G. Boyer and C. D. Fowle, York University

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To investigate the response of bacteria, algae and invertebrates in  
small ponds to applications of mosquito larvicide

DESCRIPTION: Monitoring the effects of mosquito larvicides on the chemical  
characteristics of water, bacteria number and effects on the  
productivity of algae and invertebrates

DURATION OF PROJECT	5 YEARS	PRESENT YEAR IS	5th YEAR	REPORTING DATE	Progress report December/77
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$42,000.	\$3300			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Progress report required annually				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:



Ontario

## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

## PROJECT TITLE:

Activity and persistence of some organophosphorus,  
carbamate, and pyrethroid insecticides in soil

## KEY WORDS:

soil insecticides, persistence

PRINCIPLE INVESTIGATOR  
AND AFFILIATIONR. A. Chapman, H. J. Svec and E. Y. Spencer,  
University of Western OntarioLIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:INTERNAL ☒  
GRANTUNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

## OBJECTIVE:

To assess in laboratory and field studies: a) the effectiveness of selected organophosphorus, carbamate, and pyrethroid insecticides for onion maggot control; and b) the persistence of these insecticides in soil

## DESCRIPTION:

Development of a bioassay procedure for assessing efficacy of furrow treatment of granular insecticide-fungicide combinations against onion maggot.

Development of procedures for determining the persistence of the test compounds in organic soils. Subsequent to above, tests will be set up under greenhouse conditions to determine effectiveness against onion maggot larvae and persistence of the insecticides over a ten week interval. The insecticides will include the newer pyrethroid compounds.

DURATION  
OF PROJECT2 YEARSPRESENT  
YEAR IS1st YEARREPORTING DATE Progress report  
December/77

## BUDGET:

## TOTAL DOLLARS

TOTAL PROJECT CURRENT YEAR  
\$10,900

## MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:REGULAR ☒  
WORK PROGRAMSPECIAL  
MINISTRY FUNDINGJOINTLY  
FUNDED PROJECT OTHER

## IS A REPORT ANTICIPATED?

Progress report required annually

## PARTICIPATION BY OTHER MINISTRIES:

## REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Further development of analytical method for benomyl residues in agricultural commodities and studies on the persistence of benomyl after spray application in the environment

KEY WORDS: Benomyl residue, analytical method

PRINCIPLE INVESTIGATOR  
AND AFFILIATION M. Chiba - Brock University

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop better analytical methods for benomyl fungicide and its degradation products

DESCRIPTION:

Investigation of several extraction techniques for the analysis of commercial formulations. Analysis also will be made of many formulations stored for varying periods by local growers. Determination of benomyl spray deposits and residues on plants and in fruits in relation to time.

DURATION OF PROJECT 3 YEARS PRESENT YEAR IS 3rd YEAR REPORTING DATE Progress report December, 1977

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Bioaccumulation potential of pyrethroid insecticides in  
terrestrial and aquatic food chains

KEY WORDS: pyrethroid accumulation, food chains

PRINCIPLE INVESTIGATOR AND AFFILIATION J. R. Coats - University of Guelph

LIAISON OFFICER OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ SOLICITED CONTRACT — UNSOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To determine whether the new pyrethroid pesticides have the potential to build up in the biological food chains on land and in water

DESCRIPTION:

The bioaccumulation potential of the insecticide will be assessed utilizing very basic food chains to determine if it concentrates to a greater extent at higher trophic levels.

- terrestrial food chain: treated foliage, herbivorous insect, predator (toad or spider).
- aquatic food chain: treated water, plankton, mosquito larvae, numph of dragonfly or mayfly.

DURATION OF PROJECT 2 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE Progress report December/77

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR \$8300 MAN YEARS TOTAL PROJECT CURRENT YEAR SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING — JOINTLY FUNDED PROJECT — OTHER —

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: The behavioral effects of sublethal doses of 2, 4 D butoxyethanol, glyphosate, diquat, simazine and atrazine on the rheotropic response of rainbow trout

KEY WORDS: aquatic herbicides. Effect on trout

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Dr. J. J. Dodson, University of Waterloo

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To determine whether rainbow trout migration patterns are altered by non lethal levels of aquatic herbicides

DESCRIPTION:

Special flow-through stream tanks will be used to determine whether trout can detect and attempt to avoid levels of aquatic herbicides.

The swimming ability and pattern of trout will be measured following various exposure periods to aquatic herbicides.

DURATION OF PROJECT: 1 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE Progress report December, 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR \$6000 MAN YEARS TOTAL PROJECT CURRENT YEAR SOURCE OF FUNDS: REGULAR WORK ☒ PROGRAM SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE:

Economic threshold of cereal leaf beetle *Oulema melanopus* (1) on  
oats and barley in Ontario

KEY WORDS:

cereal leaf beetle, economic threshold

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

C. R. Ellis, University of Guelph

LIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To provide data on time and degree of cereal leaf infestation  
that would warrant the use of pesticide control

DESCRIPTION:

Small plot spraying of pesticides on cereal leaf beetle infested  
fields to determine yield losses;  
Application of various populations of cereal leaf beetles to caged  
barley and oat plants at various stages of plant development.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3rd YEAR

REPORTING DATE Progress report  
December, 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT \$20,500  
CURRENT YEAR \$8000.

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Control of dark sided cutworm, Euxoa messoria (Harris) in  
southwestern Ontario tobacco fields with permethrin insecticide

KEY WORDS: Pyrethroid Cutworm control Tobacco

PRINCIPLE INVESTIGATOR  
AND AFFILIATION R. P. Gardiner, E. F. Johnson, Chipman Chemicals Ltd., Stoney Creek

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

To test potential alternatives for the pesticide leptophos

DESCRIPTION:

To test permethrin for control of dark sided cutworm using several  
application techniques.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	Progress report December, 1977
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
		\$8000			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING		JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE:

Reduction of fungicide usage on vegetable crops by timing fungicide applications according to weather data

KEY WORDS:

fungicides Timing by weather data

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

T. J. Gillespie and J. C. Sutton - University of Guelph

LIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:

INTERNAL ☐  
GRANT ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To schedule only necessary sprays as opposed to a regular preventive program

DESCRIPTION:

To test on a commercial scale a recently developed scheme for reducing the number of fungicide applications required for satisfactory control of carrot blight and onion blight diseases

DURATION  
OF PROJECT

5 YEARS

PRESENT  
YEAR IS

5th YEAR

REPORTING DATE Progress report  
December, 1977

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$39,453  
CURRENT YEAR \$9800.

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE:

Research on the control of biting flies, especially mosquitoes in Ontario

KEY WORDS:

Mosquito control

PRINCIPLE INVESTIGATOR

AND AFFILIATION B. V. Helson, G. A. Surgeoner - University of Guelph

LIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:

INTERNAL GRANT X

UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———  
SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE:

To determine the efficacy, length of activity and effects on non-target organisms of mosquito larvicides and adulticides

To evaluate certain parasites as possible control agents

DESCRIPTION:

Natural and artificial pools will be used for larvicide studies. Naturally occurring and laboratory raised mosquito species will be used in experiments. Colonies of a nematode parasite will be established at the University of Guelph for the biological control research.

DURATION  
OF PROJECT

Continuing program  
YEARS

PRESENT  
YEAR IS

3rd YEAR

REPORTING DATE Progress report  
December, 1977

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR  
\$42,840

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR  
WORK X  
PROGRAM

SPECIAL  
MINISTRY ———  
FUNDING

JOINTLY  
FUNDED ——— OTHER ———  
PROJECT

IS A REPORT ANTICIPATED?

Progress report is required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ministry of the  
Environment

## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE:

Electrostatic application of pesticides in orchards and field crops

KEY WORDS:

electrostatic application of pesticides

PRINCIPLE INVESTIGATOR  
AND AFFILIATIONI. I. Inculet, G. S. P. Castle and C. B. Kelly -  
University of Western OntarioLIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:INTERNAL  
GRANT☒UNSOLICITED CONTRACT  
SOLICITED CONTRACTMULTI-YEAR PROJECT  
CONCURRENT PROJECT

OBJECTIVE:

To determine the feasibility of minimizing pesticide use by  
electrostatic pesticide application technique

DESCRIPTION:

The development of a working applicator model suitable for  
mounting on a tractorDURATION  
OF PROJECT5 YEARSPRESENT  
YEAR IS5th YEARREPORTING  
DATEProgress report  
December, 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
\$23,000CURRENT YEAR  
\$3400.

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:REGULAR  
WORK ☒  
PROGRAMSPECIAL  
MINISTRY  
FUNDINGJOINTLY  
FUNDED  
PROJECT

OTHER

IS A REPORT ANTICIPATED?

Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Effects of insect growth regulators on emergence of black fly larvae and on non-target aquatic invertebrates

KEY WORDS: growth regulators, black fly larvae

PRINCIPLE INVESTIGATOR  
AND AFFILIATION N. K. Kaushik - University of Guelph

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To study the effect of altosid SR 10, dimelin 25 WP and other growth regulators on black fly larvae and associated non-target organisms

DESCRIPTION:

Laboratory studies will be made on the effects of growth regulators on black fly larvae. Field studies will be made on the most promising of the growth regulators. Effects of the growth regulators on non-target organisms in streams will be monitored.

DURATION OF PROJECT: 2 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE: Progress report December, 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR \$6000. MAN YEARS TOTAL PROJECT CURRENT YEAR  
SOURCE OF FUNDS: REGULAR WORK ☒ PROGRAM SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Development of monitoring techniques for apple maggot

KEY WORDS: Sex attractants Apple maggot

PRINCIPLE INVESTIGATOR  
AND AFFILIATION J. E. Laing, University of Guelph

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:  
To isolate and synthesize a sex attractant for the apple maggot,  
Rhagoletis pomonella (Walsh)  
To conduct efficacy studies of above attractants  
To determine temperature data for the prediction of emergence of  
adult apple maggots

DESCRIPTION:  
  
Synthesis of attractants to be made at York University (See  
Leznoff Research Report)  
Testing of the compounds to be made on the University of Guelph  
apple maggot colony  
Field testing of the compounds to be made on the University of  
Guelph orchard

DURATION OF PROJECT 2 YEARS PRESENT YEAR IS 2nd YEAR REPORTING DATE Progress report December, 1977

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: The chemical synthesis of candidate sex attractants for the apple maggot

KEY WORDS: Sex attractants Synthesis

PRINCIPLE INVESTIGATOR  
AND AFFILIATION C. C. Leznoff - York University

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To synthesize candidate sex attractants for the apple maggot, Rhagoletis pomonella (Walsh)  
To test efficacy of candidate sex attractants for use in monitoring apple maggot populations in Ontario apple orchards

DESCRIPTION:

Laboratory synthesis of chemical compounds having the general chemical formula of sex pheromones of lepidopteran and dipteran pests. The screening of the compounds will be made at the University of Guelph (See LAING Research Project)

DURATION OF PROJECT: 2 YEARS PRESENT YEAR IS 2nd YEAR REPORTING DATE Progress report December, 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT \$16,000 CURRENT YEAR \$8000. MAN YEARS TOTAL PROJECT CURRENT YEAR  
SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING — JOINTLY FUNDED PROJECT — OTHER —

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Herbicide residues in organic soils following the use of linuron and chlorbromuron

KEY WORDS: Linuron and chlorbromuron residues      Organic soils

PRINCIPLE INVESTIGATOR  
AND AFFILIATION C. I. Mayfield, University of Waterloo

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL ☒ GRANT      UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐      MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop more effective methods of analyzing linuron and chlorbromuron residues in organic soils

DESCRIPTION:

DURATION OF PROJECT 3 YEARS      PRESENT YEAR IS 3rd YEAR      REPORTING DATE Progress report December, 1977

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>
TOTAL PROJECT \$13,900      CURRENT YEAR \$4700.				

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE: Control of the onion maggot, Hylemya antiqua (Meigen)  
by use of the sterile male technique

KEY WORDS: Onion maggot control Sterile male

PRINCIPLE INVESTIGATOR  
AND AFFILIATION F. L. McEwen - University of Guelph

LIAISON OFFICER  
OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT ☒ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To evaluate the biological and physical parameters that determine the successful use of the sterile male technique to control the onion maggot

DESCRIPTION:

Control procedures consisting of an application of insecticide in the seed furrow at planting to control the first generation followed by application of sterile males to control the second and third generations

DURATION OF PROJECT 5 YEARS PRESENT YEAR IS 5th YEAR REPORTING DATE Progress report December, 1977

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

Ministry of the  
Environment

PAC-16

RESEARCH AND DEVELOPMENT INVENTORY

DATE: October 12, 1977

BRANCH: POLLUTION CONTROL

PROJECT TITLE: Accumulation of residues of carbamate insecticides in organic soils  
in Ontario

KEY WORDS: carbamate residues Organic soils

PRINCIPLE INVESTIGATOR

AND AFFILIATION J. R. W. Miles and E. Y. Spencer - University of Western Ontario

LIAISON OFFICER

OR SUPERVISOR Ontario Pesticides Advisory Committee

RESEARCH CATEGORY: INTERNAL GRANT X UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To determine the extent to which carbamate insecticide residues, particularly carbofuran, are present in organic soils used for vegetable production in Ontario

DESCRIPTION:

A comparison would be made of the efficiency of the techniques available for analysis of carbamate insecticides as they relate to organic soils and the major crops grown on organic soils. In following years field studies will be carried out on a number of marsh sites.

DURATION OF PROJECT 3 YEARS PRESENT YEAR IS 1st YEAR REPORTING DATE Progress report December, 1977

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR \$8000. MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM X SPECIAL MINISTRY FUNDING — JOINTLY FUNDED PROJECT — OTHER —

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

DATE: October 12, 1977

BRANCH: POLLUTION CONTROL

PROJECT TITLE:

Neuro muscular function on persons exposed to organophosphorous pesticides compared with an unexposed group

KEY WORDS:

Organophosphorous insecticides Effects on exposed humans

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

G. J. Stopps and J. R. Brown - University of Toronto

LIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To compare the neuromuscular function as measured by electro-myography on a group of Holland Marsh growers with the same functions measured on persons not exposed to organophosphorous pesticides

DESCRIPTION:

Thirty exposed and thirty unexposed subjects will be tested during the first year.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	1st YEAR	REPORTING DATE	Progress report December, 1977
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT CURRENT YEAR		
		\$18,000			
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED — OTHER — PROJECT		

IS A REPORT ANTICIPATED? Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE:

Feasibility of using the litterbag technique as an index of the environmental impact of soil insecticides on the soil fauna

KEY WORDS:

Soil insecticide soil fauna litterbag technique

PRINCIPLE INVESTIGATOR

AND AFFILIATION

A. D. Tomlin, E. Y. Spencer - University of Western Ontario

LIAISON OFFICER

OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH

CATEGORY:

INTERNAL

GRANT

X

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT

CONCURRENT PROJECT

OBJECTIVE:

To compare litter decomposition rates between pesticide treated and untreated soils

DESCRIPTION:

Determination of baseline litter decomposition rates on an orchard, cornfield and pasture field

In the first year a soil fungicide will be added to soil containing litter bags made with varying mesh sizes to control entry of specific types of soil fauna

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1st</u> YEAR	REPORTING DATE	Progress report December, 1977
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		\$8000.			
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED	OTHER	
IS A REPORT ANTICIPATED?	Progress report required annually				
PARTICIPATION BY OTHER MINISTRIES:					
REMARKS:					



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: POLLUTION CONTROL

DATE: October 12, 1977

PROJECT TITLE:

The effects of pyrethroid insecticides on soil micro-organisms  
and their activities on soil

KEY WORDS:

pyrethroid effects on soil micro-organisms

PRINCIPLE INVESTIGATOR

AND AFFILIATION C. M. Tu and E. Y. Spencer - University of Western Ontario

LIAISON OFFICER  
OR SUPERVISOR

Ontario Pesticides Advisory Committee

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the effect of certain pyrethroid insecticides on soil micro-organisms which have the capability of 'fixing' atmospheric nitrogen

DESCRIPTION:

Micro biological laboratory and controlled environment rooms will be used to determine pyrethroid effects on cultures of symbiotic and asymbiotic nitrogen fixing micro organisms.

DURATION  
OF PROJECT

2 YEARS

PRESENT  
YEAR IS

1st YEAR

REPORTING DATE Progress report  
December, 1977

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR  
\$7200.

MAN YEARS

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

Progress report required annually

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

Underground Movement of Contaminants

KEY WORDS:

Sewage Effluent, Underground Flow, Contaminant Recovery

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Dr. H.T. Chan, Applied Sciences Section  
Pollution Control Branch

LIAISON OFFICER  
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section  
Pollution Control Branch

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the subsurface movement of land-disposed  
municipal sewage treatment plant effluent.

DESCRIPTION:

The subsurface injection and recovery of contaminants  
in municipal sewage treatment plant effluent.

DURATION  
OF PROJECT

4 YEARS PRESENT  
YEAR IS 4 YEAR

REPORTING  
DATE April/78

BUDGET:

TOTAL DOLLARS  
TOTAL PROJECT \$45,000  
CURRENT YEAR \$5,000

MAN YEARS  
TOTAL PROJECT 4.0  
CURRENT YEAR 0.5

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK ☐  
PROGRAM SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Report in preparation.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

IJC-PLUARG Study of Septic Tank Discharges

KEY WORDS:

Discharge, Water Quality, Great Lakes

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

H.T. Chan, Applied Sciences Section  
Pollution Control Branch

LIAISON OFFICER  
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section  
Pollution Control Branch

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the effect of septic tank discharges on the Great Lakes.

DESCRIPTION:

Monitoring existing installations to determine contaminants reaching the Great Lakes.

DURATION  
OF PROJECT

4 YEARS

PRESENT  
YEAR IS

4 YEAR

REPORTING  
DATE

April/78

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$180,000  
CURRENT YEAR \$20,000

MAN YEARS

TOTAL PROJECT 13  
CURRENT YEAR 3

SOURCE OF  
FUNDS:

REGULAR  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☒ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

Sand Filtration of Septic Tank Effluent

KEY WORDS:

Filtration, Effluent Treatment, Septic Tank, Purification

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N.A. Chowdhry, Applied Sciences Section  
Pollution Control Branch

LIAISON OFFICER  
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section  
Pollution Control Branch

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To provide an alternative disposal system to a conventional  
tile field bed.

DESCRIPTION:

The operation and monitoring of sand filters on a septic  
tank effluent.

DURATION  
OF PROJECT

5 YEARS

PRESENT  
YEAR IS

4 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$48,000

CURRENT YEAR  
\$5,000

MAN YEARS

TOTAL PROJECT 2.5  
CURRENT YEAR 0.5

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Report on completion

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

Raised Tile Field

KEY WORDS:

Raised Bed, Tile Field, Effluent Treatment, Disposal

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

M. Brandes, Applied Sciences Section  
Pollution Control Branch

LIAISON OFFICER  
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section  
Pollution Control Branch

RESEARCH  
CATEGORY:

INTERNAL X  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the effectiveness of a raised tile bed in  
treating septic tank effluent.

DESCRIPTION:

A pilot plant field study with full monitoring.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3 YEAR

REPORTING  
DATE

Dec/77

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$15,000  
CURRENT YEAR \$5,000

MAN YEARS

TOTAL PROJECT 1.2  
CURRENT YEAR .3

SOURCE OF  
FUNDS:

REGULAR X  
WORK —  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

Report in preparation.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

Water Main Insulation

KEY WORDS:

Buried water mains, Insulation

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

A. Cohen, Applied Sciences Section  
Pollution Control Branch

LIAISON OFFICER  
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section  
Pollution Control Branch

RESEARCH  
CATEGORY:

INTERNAL X  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the effectiveness of insulation for buried  
water mains.

DESCRIPTION:

Monitoring soil temperature over and around a buried water main.

DURATION  
OF PROJECT

4 YEARS

PRESENT  
YEAR IS

2 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$55,000

CURRENT YEAR  
\$5,000

MAN YEARS

TOTAL PROJECT 2  
CURRENT YEAR 0.6

SOURCE OF  
FUNDS:

REGULAR X  
WORK —  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

Report on completion.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE:

PROJECT TITLE:

Large Scale Tile Field

KEY WORDS:

Sewage Effluent, Soil Disposal

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

H.T. Chan, Applied Sciences Section  
Pollution Control Branch

LIAISON OFFICER  
OR SUPERVISOR

M.B. Fielding, Applied Sciences Section  
Pollution Control Branch

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the effects of discharging large volumes of  
sewage effluent (>10,000 gpd) in sub-surface soil systems.

DESCRIPTION:

Effluent from an extended aeration STP is discharged by a  
dosing system, to a 1.25 acre tile field. Chemical and hydraulic  
parameters are monitored by means of a well point net.

DURATION  
OF PROJECT

4 YEARS

PRESENT  
YEAR IS

2 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$85,000  
CURRENT YEAR \$5,000

MAN YEARS

TOTAL PROJECT 5  
CURRENT YEAR 1.5

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE:

Distribution System Survey

KEY WORDS:

Distribution System

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

A. Vajdic - Water Technology Section

LIAISON OFFICER  
OR SUPERVISOR

K. J. Roberts

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

Examine bacteriological quality in distribution systems  
and obtain correlation with raw and treated water quality  
parameters.

DESCRIPTION:

Sampling survey of raw and treated water and water in  
distribution systems from a number of treatment plants.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3 YEAR

REPORTING  
DATE

Aug/77

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
\$65,000

CURRENT YEAR  
\$20,000

TOTAL PROJECT  
3

CURRENT YEAR  
1.25

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE:

Distribution System - Small Animal Survey

KEY WORDS:

Distribution, Animals

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

H. Graham - Water Technology Section

LIAISON OFFICER  
OR SUPERVISOR

K. Roberts

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To study and investigate removal methods, small animals (e.g. snails, nematodes) in distribution systems.

DESCRIPTION:

Sample collection and survey following foam-swab cleaning of distribution mains; isolation, identification and enumeration of animal species.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

2 YEAR

REPORTING  
DATE

Dec/78

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$23,000.  
CURRENT YEAR \$7,000.

MAN YEARS

TOTAL PROJECT 1.5  
CURRENT YEAR 0.5

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE:

Parasites in Sewage Sludges

KEY WORDS:

Parasites, Sludge

PRINCIPLE INVESTIGATOR

AND AFFILIATION

H. J. Graham - Water Technology Section

LIAISON OFFICER

OR SUPERVISOR

K. J. Roberts

RESEARCH

CATEGORY:

INTERNAL —

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT x

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

To assess the health hazard associated with parasites in  
sewage sludges used on land.

DESCRIPTION:

Isolation, identification and enumeration of  
parasites, ova and cysts.

DURATION  
OF PROJECT

3 YEARS

PRESENT  
YEAR IS

3rd YEAR

REPORTING  
DATE

March, 1978

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$59,500

CURRENT YEAR  
\$16,500

MAN YEARS

TOTAL PROJECT  
4

CURRENT YEAR  
1.33

SOURCE OF  
FUNDS:

REGULAR  
WORK —  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED COA  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE: Chlorinated Organic Formation and Reduction  
Drinking Water Treatment

KEY WORDS: Chl Org.

PRINCIPLE INVESTIGATOR  
AND AFFILIATION C. Fung - Water Technology Section

LIAISON OFFICER  
OR SUPERVISOR K. J. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To study the formation of chlorinated organics following the chlorine treatment slip of water treatment and to investigate methods of reduction and removal of such compounds formed.

DESCRIPTION:

- Provincial Survey of types and magnitudes of chlorinated organics in Ontario drinking waters
- Investigate methods to optimise chlorinated organic removal during water treatment

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>March, 1978</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$70,000	\$21,000	4	1 1/2	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	
IS A REPORT ANTICIPATED?	Yes				

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE:

Ozonation of Potable Water Supplies

KEY WORDS:

Ozone

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

A. Oda - Water Technology Section

LIAISON OFFICER  
OR SUPERVISOR

K. J. Roberts

RESEARCH  
CATEGORY:

INTERNAL ~~✗~~  
GRANT —

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT —

MULTI-YEAR PROJECT —  
CONCURRENT PROJECT —

OBJECTIVE:

To investigate the use of ozone in potable water treatment.

DESCRIPTION:

Laboratory bench scale and pilot plant studies of ozonation as applied to potable water treatment. Especially investigated will be coloured waters with low turbidity, and the use of ozone as an alternative disinfectant to avoid chlorinated organic by-products. This is essentially an on-going area of study e.g. a report on an investigation at Smiths Falls WTP has been prepared.

DURATION OF PROJECT	_____ YEARS	PRESENT YEAR IS	_____ YEAR	REPORTING DATE	_____
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
	\$18,000.	\$18,000.			1
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY _____ FUNDING		JOINTLY FUNDED _____ PROJECT	OTHER _____

IS A REPORT ANTICIPATED? Reports are written for each investigation

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

## PROJECT TITLE:

Asbestos in Drinking Water Supplies

## KEY WORDS:

Asbestos, Water

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

R. B. Hunsinger - Water Technology Section

LIAISON OFFICER  
OR SUPERVISOR

K. J. Roberts

RESEARCH  
CATEGORY:INTERNAL ☒   
GRANT ☐UNSOLICITED CONTRACT ☐   
SOLICITED CONTRACT ☐MULTI-YEAR PROJECT ☐   
CONCURRENT PROJECT ☐

## OBJECTIVE:

To survey asbestos levels in raw water and  
drinking water throughout Ontario.

## DESCRIPTION:

Raw and potable water supplies throughout Ontario will be  
surveyed for asbestos levels. The data will be tabulated  
with raw water type, water treatment plant process and  
finished water quality.DURATION  
OF PROJECT

\_\_\_\_ YEARS

PRESENT  
YEAR IS5 YEARREPORTING  
DATE \_\_\_\_\_

## BUDGET:

TOTAL DOLLARS  
TOTAL PROJECT CURRENT YEARMAN YEARS  
TOTAL PROJECT CURRENT YEARSOURCE OF  
FUNDS:REGULAR  
WORK ☒   
PROGRAMSPECIAL  
MINISTRY ☐   
FUNDINGJOINTLY  
FUNDED ☐   
PROJECT OTHER ☐

## IS A REPORT ANTICIPATED?

Yes, reports are prepared as results are accumulated and need is in-  
cated.

## PARTICIPATION BY OTHER MINISTRIES:

## REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE: Flotation

KEY WORDS: A. Oda - Water Technology Section

PRINCIPLE INVESTIGATOR  
AND AFFILIATION K. J. Roberts

LIAISON OFFICER  
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To study the use of the flotation principle as applied to potable water clarification.

DESCRIPTION:

The clarification of water by flotation rather than sedimentation appears to have several advantages; increased rate of throughput with a consequent smaller unit, solids such as algae which are difficult to settle can be removed, the final sludge concentration is greater (about 4-6%) making disposal more economic.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Dec/78</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$45,000.	\$12,000.	2	2/3	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE:

Asbestos Removal from Potable Water

KEY WORDS:

Asbestos, Potable Water

PRINCIPLE INVESTIGATOR

AND AFFILIATION R. B. Hunsinger - Water Technology Section

LIAISON OFFICER

OR SUPERVISOR K. J. Roberts

RESEARCH

CATEGORY:

INTERNAL X  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To investigate the optimisation of asbestos removal  
during water treatment.

DESCRIPTION:

Potable water treatment optimised for turbidity removal  
and further optimised (if necessary by polymer addition).

DURATION  
OF PROJECT

2 YEARS

PRESENT  
YEAR IS

2 YEAR

REPORTING  
DATE April, 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

MOE Funds Only

TOTAL PROJECT  
\$30,000

CURRENT YEAR  
\$12,000

TOTAL PROJECT  
2

CURRENT YEAR  
1

SOURCE OF  
FUNDS:

REGULAR  
WORK —  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED X OTHER —  
PROJECT with CCIW

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Joint Project with CCIW



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: Sept. 28, 1977

PROJECT TITLE: Manganese Sequestration

KEY WORDS: Manganese

PRINCIPLE INVESTIGATOR  
AND AFFILIATION F. J. Dart - Water Technology Section

LIAISON OFFICER  
OR SUPERVISOR K. J. Roberts

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To control manganese in water supplies

DESCRIPTION: Control of manganese by sequestration with hydrogen peroxide addition to the raw water will be studied and further optimised.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>March, 1978</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$12,000.	\$4,000.	0.4	0.2	
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: October 20, 1977

PROJECT TITLE:

Biological Nitrification Process Evaluation

KEY WORDS:

Biological nitrification, single sludge, full-scale

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

A. Smith, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR

S.A. Black

RESEARCH  
CATEGORY:

INTERNAL ☐  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the operational parameters and the treatment capabilities of the biological nitrification-denitrification process.

DESCRIPTION:

Laboratory, pilot-scale and full-scale evaluations have been conducted on the single-sludge process in order to optimize design criteria such as: detention times for aeration and denitrification, mixed liquor suspended solids, sludge age, sludge return rates, methanol dosages, etc. The program is being extended into a 6th year for a study of automatic controls on a nitrification process only.

DURATION  
OF PROJECT

6 YEARS

PRESENT  
YEAR IS

6th YEAR

REPORTING  
DATE

December, 1978

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT \$40,000  
CURRENT YEAR \$4,000

MAN YEARS

1977  
TOTAL PROJECT CURRENT YEAR  
0.2

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☒ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Pollution Control

DATE: October 20, 1977

PROJECT TITLE:

Nitrification of Sewage Treatment Plant Effluents

KEY WORDS:

Nitrification, secondary effluent, rotating biological contactor,  
fixed bed reactor

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

V. Hraseova, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR

R. Khettry

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐

SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐

CONCURRENT PROJECT ☐

OBJECTIVE:

To evaluate unit processes suitable for providing high degree  
nitrification of secondary effluents.

DESCRIPTION:

Pilot equipment has been installed at an operating sewage treatment  
plant to determine operational parameters and efficiencies of the  
rotating biological contactor and a fixed bed reactor for nitrifying  
secondary effluent.

This program is being extended by 1 year.

DURATION  
OF PROJECT

2 YEARS

PRESENT  
YEAR IS

2nd YEAR

REPORTING  
DATE

December, 1978

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$7,500

CURRENT YEAR  
\$5,000

MAN YEARS

TOTAL PROJECT  
2.0

CURRENT YEAR  
1.0

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐  
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control

DATE: October 20, 1977

PROJECT TITLE:

Mixing in Anaerobic Digesters

KEY WORDS:

Mixing, Digesters

PRINCIPLE INVESTIGATOR

AND AFFILIATION

J. Smart, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR

R.K. Khettry

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐   
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☐   
CONCURRENT PROJECT ☐

OBJECTIVE:

A study of the relative efficiencies of the various mixing devices used in anaerobic digesters in Ontario.

DESCRIPTION:

Up to 10 anaerobic digesters will be dosed with sodium fluoride. Sludge samples will be taken to determine, (2) how quickly the fluoride is dispersed in the digester, and (b) how long does the primary digester effluent need for a "wash-out" of the fluoride.

DURATION  
OF PROJECT

1 YEARS

PRESENT  
YEAR IS

1 YEAR

REPORTING  
DATE

June, 1978

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

\$3,000

CURRENT YEAR

\$3,000

MAN YEARS

TOTAL PROJECT

0.2

CURRENT YEAR

0.2

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐  
PROJECT

OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Pollution Control

DATE:

October 20, 1977

PROJECT TITLE:

Aerated Lagoon Evaluation

KEY WORDS:

Aerated lagoon, design, operation

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

W. Lewandowski, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR

S.A. Black

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To conduct a detailed evaluation of existing aerated lagoons in Ontario to optimize design and operational criteria.

DESCRIPTION:

This project involves one-week summer and winter evaluations of 5 aerated lagoon system installations in the Province. Factors such as: treatment efficiency, aeration capacity, mixing capabilities, etc. will be determined and evaluated.

DURATION  
OF PROJECT

1 YEARS

PRESENT  
YEAR IS

1 YEAR

REPORTING  
DATE December, 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

\$2,500

\$2,500

0.4

0.4

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ministry of the  
Environment

## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Pollution Control DATE: November, 1977

PROJECT TITLE: Investigation of a U-Flume for In-Sewer Flow Measurement

KEY WORDS: U-Flume in sewer flow measurement

PRINCIPLE INVESTIGATOR AND AFFILIATION G. Zukovs, Ministry of the Environment, Wastewater Treatment Section

LIAISON OFFICER OR SUPERVISOR F. Tonelli, MOE, Wastewater Treatment Section

RESEARCH CATEGORY: INTERNAL — GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To determine the rating characteristics of a U-Flume device under open channel, and pressure flow, for various sewer slopes.

## DESCRIPTION:

Theoretical and hydraulic laboratory studies to investigate the performance of the U-Flume.

DURATION OF PROJECT: 2 YEARS PRESENT YEAR IS 2nd YEAR REPORTING DATE August, 1978

BUDGET: TOTAL DOLLARS TOTAL PROJECT \$9,000 CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM X SPECIAL MINISTRY FUNDING JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: November, 1977

PROJECT TITLE: Assessment of Municipal Bypass Flow

KEY WORDS: Quality, quantity, municipal bypass flows

PRINCIPLE INVESTIGATOR  
AND AFFILIATION G. Zukovs, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR F. A. Tonelli, MOE

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To collect data on the quality and quantity of municipal sewerage bypass flows.

DESCRIPTION:

Installations were made at four municipalities, one with partly combined and three with separate sewer systems with varying degrees of bypass activity. Attempts will be made to relate the quality and quantity of bypass flow to physical and environmental factors associated with each municipality.

DURATION OF PROJECT: 4 YEARS PRESENT YEAR IS 4th YEAR REPORTING DATE December, 1978

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$101,200	Nil		
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	COA <u>73-1-28</u> OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: November, 1977

PROJECT TITLE:

Users Manual for Flow Monitoring Techniques

KEY WORDS: Manual, flow monitoring, Ontario, theoretical design, system design

PRINCIPLE INVESTIGATOR  
AND AFFILIATION G. Zukovs, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR F. A. Tonelli, MOE

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE:

Based upon field evaluation of equipment and systems, a manual of flow monitoring techniques covering Ontario conditions and using equipment and systems readily available on the Ontario market will be prepared.

DESCRIPTION:

The manual will provide theoretical background, system design and installation information in a practical user oriented manner.

DURATION OF PROJECT 2 YEARS PRESENT YEAR IS 2nd YEAR REPORTING DATE March, 1978

BUDGET: TOTAL DOLLARS TOTAL PROJECT \$12,000 CURRENT YEAR \$10,000 MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK X PROGRAM SPECIAL MINISTRY — FUNDING JOINTLY FUNDED COA PROJECT 77-1-46 OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Assistance from CCIW.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: November, 1977

PROJECT TITLE:

Sewage Effluent Disinfection with Chlorine

KEY WORDS:

Chlorination, optimization of mixing and contact, chlorine toxicity

PRINCIPLE INVESTIGATOR

AND AFFILIATION

F. A. Tonelli, Ministry of the Environment

LIAISON OFFICER

OR SUPERVISOR

S. A. Black, MOE

RESEARCH

CATEGORY:

INTERNAL —

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT —

CONCURRENT PROJECT —

OBJECTIVE:

- 1) To confirm the bactericidal importance of various controllable factors in the disinfection of secondary effluent by chlorination.
- 2) To evaluate a chlorine disinfection system containing optimal process stages with respect to overall bactericidal performance and relative contribution of each stage.

DESCRIPTION:

On a pilot field scale system evaluations will be made to optimize the effectiveness of chlorine in the disinfection of sewage effluents to reduce the cost of the disinfection process and to reduce the unit rate of emission of chlorine-induced toxicity in WPCP effluents.

DURATION  
OF PROJECT

1

YEARS

PRESENT  
YEAR IS

2nd

YEAR

REPORTING  
DATE

March, 1978

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$49,000

\$20,000

SOURCE OF  
FUNDS:

REGULAR

WORK —

PROGRAM

SPECIAL

MINISTRY —

FUNDING

JOINTLY

FUNDED COA

PROJECT 76-1-44

OTHER —

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: November, 1977

PROJECT TITLE:  
Effluent Disinfection

KEY WORDS: Comparison of disinfection techniques, chlorine, chlorine dioxide, ozone

PRINCIPLE INVESTIGATOR  
AND AFFILIATION F. A. Tonelli, Ministry of the Environment

LIAISON OFFICER  
OR SUPERVISOR S. A. Black, MOE

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:  
To compare the efficiencies, advantages and disadvantages of various disinfection techniques and to evaluate the toxicities of the effluents produced.

DESCRIPTION:  
Studies have been conducted with chlorine, ozone and chlorine dioxide to compare efficiencies of bacterial and virological disinfection of various activated sludge effluents (i.e. nitrified, denitrified, conventional).

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>4th</u> YEAR	REPORTING DATE	<u>March, 1978</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$51,600	\$5,000			
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	COA <u>74-1-33</u>	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: WATER RESOURCES

DATE: December 19, 1977

PROJECT TITLE: Bio-accumulation rates, Acute and Chronic Effects of Five New Dielectric Fluids on American Flagfish

KEY WORDS: Dielectric Fluids, American Flagfish, Carcinogens, Bio-accumulation, PCB's

PRINCIPLE INVESTIGATOR AND AFFILIATION: G. W. Ozburn  
Lakehead University, Thunder Bay, Ontario

LIAISON OFFICER OR SUPERVISOR: G. Craig

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT X MULTI-YEAR PROJECT ———  
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE:

1. To determine bio-accumulation rates of P.C.B. substitutes in brook trout;
2. To compare the acute (lethal) levels of these products using flagfish;
3. To evaluate the chronic effects of the same products on the life cycle of Jordanella.

DESCRIPTION:

Five substitution products for P.C.B.'s selected in conjunction with Ontario Hydro will be tested to determine their health effects and environmental properties.

The results should show whether the products are bio-accumulative and their acute and chronic toxicity.

These results will be utilized along with other data being accumulated by Ontario Hydro to determine the acceptability of these potential P.C.B. substitutes.

To fund a substitute for P.C.B.'s that do not have the adverse health and associated environmental hazards but do retain the benefits of their commercial use.

DURATION OF PROJECT: 2 YEARS PRESENT YEAR IS the 1st YEAR REPORTING DATE: March, 1978

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$127,280	\$127,280		66,937
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER Provincial Lottery

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: No

REMARKS:

Project 77-003-32





RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: LABORATORY SERVICES

DATE: April 15, 1977

PROJECT TITLE: Detection, Enumeration and Interpretation of Levels of Virus  
in Drinking Water & Bathing Waters.

KEY WORDS: Virus, Drinking Water, Bathing Water, Water Quality, Ottawa River

PRINCIPLE INVESTIGATOR AND AFFILIATION: Dr. Syed A. Sattar, Faculty of Medicine,  
University of Ottawa, Ottawa, Ontario

LIAISON OFFICER OR SUPERVISOR: L. T. Vlassoff

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———  
GRANT ——— SOLICITED CONTRACT ~~X~~ CONCURRENT PROJECT ———

OBJECTIVE:  
To provide guidelines to interpret the significance of levels and types  
of virus in bathing and drinking waters;  
To determine levels of virus in the Ottawa River;  
To identify types of virus isolated above using developed techniques.

DESCRIPTION:

Collect samples of sewage plant effluents, Britannia Beach water and Britannia  
Water Treatment Plant water. Use specialized sensitive techniques to determine  
numbers and types of virus.  
Prepare guidelines for the interpretation of specific levels of virus particularly  
for swimming water.  
This project will provide a basis for Ministry development of guidelines and an  
insight into water quality re virus in an area where virus have been frequently  
reported. The special concentration techniques required for virus isolation must  
be verified.

DURATION OF PROJECT	1 YEARS	PRESENT YEAR IS	the first YEAR	REPORTING DATE	March 31, 1978
BUDGET:	TOTAL DOLLARS			MAN YEARS	
	TOTAL PROJECT		CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
\$39,000	\$39,000		\$39,000		
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM		SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ——— Provincial Lottery
IS A REPORT ANTICIPATED?	Yes				
PARTICIPATION BY OTHER MINISTRIES:					

REMARKS:

Project 77-004-11



RESEARCH AND DEVELOPMENT INVENTORY

• BRANCH: Pollution Control

DATE: May 20, 1977

PROJECT TITLE: An Investigation of the Environmental Health Hazards Associated  
with Road Oiling

KEY WORDS: Road Oil, Oiling of Highways

PRINCIPLE INVESTIGATOR AND AFFILIATION Frank Guillaume  
L. S. Love & Associates, Brampton, Ontario

LIAISON OFFICER OR SUPERVISOR F. R. Phoenix

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———  
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE:

- To determine the nature and origin of materials utilized as "road oil";
- To determine what contaminants are present in "road oil";
- To observe the application of the material and the migration of the contaminants into the environment;
- To determine the effects on soils, crops, vegetation and aquatic life;
- To evaluate the potential hazard to human health and the environment.

DESCRIPTION:

To study the nature of the contaminants in the material applied, the movement of these into the environment and the mechanisms involved. Runoff will be monitored and samples of soil and roadbed will be analyzed. Vegetation and crops will be examined to determine surface contamination as well as the uptake of metal etc. Air samplers will be employed to estimate the quantity of dust transported from the roads. Four sites will be considered to provide as many physical variables as possible. Because of climatic variations and the anticipated rate of movement of contaminants, it is suggested the study be carried on for two full years. However, this initial proposal is for one year only. The results will indicate whether further study is needed.

Sound information will be collected to determine whether the practice whereby all manner of liquid industrial wastes together with used oils are disposed of on rural roads can be eliminated.

DURATION OF PROJECT	1 YEARS	PRESENT YEAR IS	first YEAR	REPORTING DATE	March 31, 1978
BUDGET:		TOTAL DOLLARS		MAN YEARS	
		TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	\$98,900	\$98,900	\$98,900		
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING		JOINTLY FUNDED PROJECT	OTHER Provincial Lottery

IS A REPORT ANTICIPATED? Yes. Documenting the hazards and suggesting alternatives and acceptable methods of disposal for used oils.

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Transportation and Communications

REMARKS:

Project 77-005-11



## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Pollution Control

DATE:

June 21, 1977

PROJECT TITLE: The Spread of St. Louis Encephalitis Through Avian and Rodent  
Reservoirs

KEY WORDS: Encephalitis, Rodents, Birds, Mosquitos, Spraying, St. Louis Encephalitis

PRINCIPLE INVESTIGATOR J. R. Brown (Deceased, July 30, 1977)  
AND AFFILIATION University of Toronto, Toronto, Ontario

LIAISON OFFICER G. Finan, Pesticides Control Section  
OR SUPERVISOR

RESEARCH INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT ———  
CATEGORY: GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE: To elucidate the role of rodents on the "endemic" area of  
Southern Ontario as possible hosts for SLE virus.

To develop a capacity of predicting the spillover point of SLE  
virus in man. The information will be used in the implementation of the spraying  
program for the control of mosquitos.

## DESCRIPTION:

It is proposed to collect white-throated and white-crowned sparrows  
from the region of Algonquin Park, take blood samples and carry out serological  
examination for SLE antibodies. Also, the cranial contents will be removed to be  
used for virus isolation procedures. Ecto parasites will be examined for SLE virus.  
At the same time, rodents will be collected in the "endemic" areas of Southern  
Ontario and blood samples taken for serology and virology studies at the University  
of Toronto. Standard methods for HI tests will be used with the confirmation by  
other laboratories for all positive serology as well as confirmatory virus inactivation.

- A clearer picture will be obtained of vertebrate participation and species of  
mosquitoes involved in the transmission of St. Louis encephalitis.
- A better understanding of the connection between rodents and SLE virus propagation  
will be obtained.
- A clearer picture will be obtained of the percentage of the disease imported annually in  
migratory birds.

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	the first <u>      </u> YEAR	REPORTING DATE	August, 1977
BUDGET:	\$7,910	TOTAL DOLLARS		MAN YEARS	
	Original contract was \$35,000	TOTAL PROJECT	CURRENT YEAR \$7,910	TOTAL PROJECT	CURRENT YEAR
SOURCE OF FUNDS:	REGULAR WORK ——— PROGRAM	SPECIAL MINISTRY ——— FUNDING	JOINTLY FUNDED ——— PROJECT	OTHER ——— Provincial Lottery	
IS A REPORT ANTICIPATED?	Received August, 1977 for FY 77/78 after the death of J. R. Brown.				
PARTICIPATION BY OTHER MINISTRIES: Ministry of Health					

## REMARKS:

Project 77-006-11



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Pollution Control

DATE: November 1, 1977

PROJECT TITLE: Chloroform Reduction Investigation Program at Belleville  
Utilities Commission

KEY WORDS: Drinking Water, Chloroform, Public Water Supply

PRINCIPLE INVESTIGATOR AND AFFILIATION: Belleville Utilities Commission, Belleville, Ontario  
Gore & Storrie Ltd., Toronto, Ontario

LIAISON OFFICER OR SUPERVISOR: Cynthia Fung, Water Technology Section

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ———  
GRANT ——— SOLICITED CONTRACT ——— CONCURRENT PROJECT ———

OBJECTIVE: To demonstrate that laboratory techniques developed by MOE staff will effectively reduce chloroform production during disinfection of drinking water with chlorine.

The results of the study will be applied in the design of the new Belleville treatment plant extension and can be utilized by other municipalities with similar problems both in Ontario and elsewhere.

DESCRIPTION: The existing plant will be altered so that chlorination will take place after sedimentation in phase 1 and after sedimentation and filtration in phase 2. Production of chloroform and other haloforms will be measured when chlorine is applied following treatment. This can be compared to the normal plant effluent treated in the usual manner.

Ministry staff have developed laboratory methods of reducing chloroform production while using chlorine for the disinfection of water supply. These techniques must now be applied to a full-scale plant. If successful, the technique can be applied to most Ontario plants as this plant is typical of most.

Analytical assistance will be provided to this project by Laboratory Services Branch.

DURATION OF PROJECT	<u>2</u> YEARS	PRESENT YEAR IS	<u>the first</u> YEAR	REPORTING DATE	<u>March 31, 1978</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
\$29,000	\$29,000	\$15,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
				Provincial Lottery	
IS A REPORT ANTICIPATED?					
Yes					
PARTICIPATION BY OTHER MINISTRIES:					
Belleville Utilities Commission					

REMARKS:

Project 77-008-32



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Resource Recovery

DATE: September 16, 1977

PROJECT TITLE: Energy Considerations for Multiple-Hearth and Fluidized Bed Sludge Incineration

KEY WORDS:

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Gore & Storrie Limited

LIAISON OFFICER  
OR SUPERVISOR S. A. Black, Wastewater Treatment Section

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: The purpose of this project is to evaluate and compare the total net energy requirements for the multiple-hearth and fluidized bed sewage sludge incineration processes, including alternate sludge conditioning and dewatering techniques, and to examine the potential for energy recovery and utilization from the processes.

DESCRIPTION: The study will be devoted to a review of current literature, manufacturers' information and a concentrated review of the operation of various installations of the two types of incinerators through direct communication.

The study will address technical, environmental, energy and economic considerations in the design and operation of the two incinerators including associated conditioning and dewatering steps for Ontario sludges and identify any areas of inadequate information.

The study will also assess other sewage sludge destruction processes showing potential for future use in Ontario.

DURATION OF PROJECT: PRESENT YEAR IS YEAR REPORTING DATE Dec. 31/77

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR MAN YEARS TOTAL PROJECT CURRENT YEAR

\$18,000

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☒ OTHER ☐

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: Energy

REMARKS:



## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Resource Recovery

DATE: September 12, 1977

PROJECT TITLE: Innovative Refuse Collection Pilot Study

KEY WORDS: solid waste, collection

PRINCIPLE INVESTIGATOR AND AFFILIATION W. Coulter, City of Windsor

LIAISON OFFICER OR SUPERVISOR B. I. Boyko, Technology and Market Development, MOE

RESEARCH	INTERNAL	<input checked="" type="checkbox"/>	UNSOLICITED CONTRACT	<input type="checkbox"/>	MULTI-YEAR PROJECT	<input type="checkbox"/>
CATEGORY:	GRANT	<input type="checkbox"/>	SOLICITED CONTRACT	<input type="checkbox"/>	CONCURRENT PROJECT	<input type="checkbox"/>

OBJECTIVE: To investigate problems of mechanized waste collection and to conduct research related to waste collection and different methods of waste collection.

## DESCRIPTION:

Two different types of mechanized residential refuse collection systems have been placed in service on three collection routes within the City of Windsor. The study commenced in October, 1976 and will continue for a one-year period. Collection costs and productivity measurements will be used to assess results as well as potential applicability to other municipalities in Ontario.

DURATION OF PROJECT	2.0 YEARS	PRESENT YEAR IS	2nd YEAR	REPORTING DATE	March, 1978
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$100,000	--	0.5	0.25	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS: Ministry funding supplied for capital equipment only. Equipment maintenance and data collection, responsibility of the City of Windsor. Ministry to prepare report.





FINANCE: Resource Recovery

DATE: September 12, 1977

PROJECT TITLE:

Use of Refuse Derived Fuel in Cement Kilns

KEY WORDS:

energy, refuse derived fuel (RDF), solid waste

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

P. J. Provias, Resource Recovery, MOE  
R. M. Brannen, Canada Cement Lafarge Limited

LIAISON OFFICER  
OR SUPERVISOR

B. I. Boyko, Technology and Market Development, moe

RESEARCH  
CATEGORY:

INTERNAL ☒ X  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒ X  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To investigate the use of refuse derived fuel (RDF)  
as a fuel supplement in cement kiln operation.

DESCRIPTION:

A demonstration project using RDF as a supplement to fossil fuels will be conducted at the Company's Woodstock plant. RDF, prepared at the Experimental Plant for Resource Recovery, will be used up to a maximum of 50 percent of the fuel energy supply, if feasible. Ministry funding will cover the engineering, supply and installation of the materials receiving and pneumatic handling system. Air emission testing prior to and during the firing phases of the study will be conducted by the Ministry.

DURATION OF PROJECT	3 YEARS	PRESIDENT YEAR 15	2nd YEAR	REPORTING DATE	June, 1979
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	\$290,000	\$150,000	0.5	0.25	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	
	<input checked="" type="checkbox"/> X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Resource Recovery

DATE: August 9, 1977

PROJECT TITLE: Modelling Regional Solid Waste Management Systems

KEY WORDS: computer modelling, waste systems

PRINCIPLE INVESTIGATOR AND AFFILIATION L. Jenkins, University of Toronto

LIAISON OFFICER OR SUPERVISOR G. C. Chisamore  
R. M. Warner

RESEARCH CATEGORY: INTERNAL GRANT ☒ SOLICITED CONTRACT ☐ UNSOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To develop a waste management systems model which can be utilized as a planning tool for the location and planning of resource recovery systems.

DESCRIPTION:

Description of Research: The work examines computer modelling of regional solid waste management systems with particular reference to the Resource Recovery Programme in Ontario. Preliminary analysis has highlighted two important and difficult problems in this area:

1. The economies of scale in building and operating facilities create a trade-off between facility costs and transportation costs which must be analyzed. Appropriate computer models tend to be large and expensive to run.
2. Uncertainty in the data, particularly concerning resource recovery process costs and markets for recovered materials, make it important to analyze a number of alternate futures. To systematically use a computer model to do this requires development of new methodology.

Future Work:

1. Formulation and programming of a multi-period model.
2. Development of a methodology of using the model to analyze a range of alternative futures without incurring exorbitant computer costs.
3. Consideration of partitioning a large study area into smaller areas to permit tractable analysis of large metropolitan areas.

DURATION OF PROJECT: 1 YEARS PRESENT YEAR IS 1 YEAR REPORTING DATE: March, 1979

BUDGET: TOTAL DOLLARS TOTAL PROJECT \$11,500 CURRENT YEAR \$11,500 MAN YEARS TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES: None

REMARKS: Has been discussed with G. Scanlon, August 9, 1977





RESEARCH AND DEVELOPMENT INVENTORY

Office

BRANCH: Resource Recovery

DATE: September 8, 1977

PROJECT TITLE:

Mixed Office Waste Paper Study in Federal and Provincial Buildings in Toronto

KEY WORDS:

waste paper, source separation

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

C. Gentile - Reed Ltd.  
P. Tanaka - Leonard & Partners Ltd.

LIAISON OFFICER  
OR SUPERVISOR

Peter J. Provias - Resource Recovery Branch, MOE

RESEARCH  
CATEGORY:

INTERNAL ☐  
GRANT ☐

UNSOLICITED CONTRACT ☐  
SOLICITED CONTRACT ☒

MULTI-YEAR PROJECT ☐  
CONCURRENT PROJECT ☐

OBJECTIVE:

To determine the feasibility of increasing the recycling of office waste paper generated from the federal and provincial buildings in Toronto.

DESCRIPTION:

A building survey involving 24 provincial and federal buildings in Toronto was conducted to determine mixed office waste paper generation, quantity and quality, disposal methods used, and activity profile of each building. Additional objectives were to establish procedures that might be implemented at various locations to increase waste paper recovery and/or determine alternate methods for collecting and transporting waste paper from the source buildings. In essence, the work consisted of a) building survey, b) sampling survey of office waste paper, c) review and analysis of waste paper recovery systems.

DURATION  
OF PROJECT

one  
YEAR

PRESENT  
YEAR IS

1  
YEAR

REPORTING  
DATE

July, 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
\$19,800

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

60% Federal  
40% Provincial

REGULAR  
WORK  
PROGRAM

SPECIAL  
MINISTRY  
FUNDING

JOINTLY  
FUNDED  
PROJECT

OTHER

IS A REPORT ANTICIPATED?

Report has been completed.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Resource Recovery

DATE: September 8, 1977

PROJECT TITLE:

Use of Waste Cellulose Fibre as loose fill insulation

KEY WORDS:

cellulose fibre insulation (CFI), resource recovery, waste paper

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Dr. Cyril Gibbons, Ontario Research Foundation

LIAISON OFFICER  
OR SUPERVISOR

Peter J. Provias, Resource Recovery Branch, MOE

RESEARCH  
CATEGORY:

INTERNAL ☐  
GRANT ☐

UNSOLICITED CONTRACT ☐  
SOLICITED CONTRACT ☒

MULTI-YEAR PROJECT ☐  
CONCURRENT PROJECT ☐

OBJECTIVE:

To evaluate the clean, air classified, mixed paper fraction separated from the Experimental Plant for Resource Recovery as a possible cellulose fibre base for the manufacture of loose cellulose insulation in which it is common practice to use used newspapers as a cellulose base.

DESCRIPTION:

The mixed paper fraction is to be evaluated as a cellulose fibre against the standard cellulose base, e.g. newspapers, for making cellulose insulation and the subsequent product will be tested in accordance with Canadian Government Specification Board testing procedures as performed at the Building Research Division of National Research Council. Factors to be investigated include thermal conductivity, settling characteristics, moisture effects, fire resistance, corrosion resistance, fungus resistance and an energy audit on the manufacturing process.

DURATION  
OF PROJECT

1/2  
YEARS

PRESENT  
YEAR IS

1977  
YEAR

REPORTING  
DATE

October, 1977

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$22,000

CURRENT YEAR  
\$22,000

MAN YEARS

TOTAL PROJECT  
--

CURRENT YEAR  
--

SOURCE OF  
FUNDS:

REGULAR

SPECIAL

JOINTLY ☒

WORK

MINISTRY

FUNDED

OTHER ☐

PROGRAM

FUNDING

PROJECT

Energy Manage-  
ment Programme

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Ministry of Energy

REMARKS:



SEARCH: Resource Recovery

DATE: September 12, 1977

PROJECT TITLE:

Experimental Plant for Resource Recovery

KEY WORDS:

Resource Recovery, Solid Waste Management

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N. R. Ahlberg, Technology and Market Development Section,  
Resource Recovery Branch

LIAISON OFFICER  
OR SUPERVISOR

B. I. Boyko, Technology and Market Development Section,  
Resource Recovery Branch

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To construct a resource recovery plant to evaluate unit processes for resource recovery; to produce working quantities of recovered materials; to establish markets for recovered resources; to establish costs for resource recovery processes and systems; to provide facilities in which external resource recovery research studies can be conducted.

DESCRIPTION:

A 300 ton/day experimental resource recovery plant, also incorporating a 600 ton/day transfer station, currently in operation, is under construction in North York. Unit processes included in this facility are: shredding, air separation, air classification, magnetic separation, screening, composting, compaction, baling, conveying systems, and energy recovery. Recovered materials will include paper, cardboard, ferrous metals, non-ferrous metals, glass, clean paper fibre, organic fibre, and compost.

DURATION  
OF PROJECT

Capital Works  
YEARS

PRESENT  
YEAR IS

3rd  
YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR  
\$13.8 million capital; \$2.35 million operating 4.25

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Project reports issued through Resource Recovery Branch

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

\$1.8 million revenue projected.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Waste Management Advisory Board

DATE: Dec. 16, 1977

PROJECT TITLE:

Urban Solid Waste Generation in Ontario -  
Report No. 2 of the Waste Indices Subcommittee

KEY WORDS:

Solid Waste Generation in Ontario

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Currie, Coopers & Lybrand Ltd., Management Consultants.

LIAISON OFFICER  
OR SUPERVISOR

P. J. Crabtree

RESEARCH  
CATEGORY:

INTERNAL —  
GRANT —

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT X

MULTI-YEAR PROJECT —  
CONCURRENT PROJECT —

OBJECTIVE:

To develop a reliable and comprehensive cost accounting system that will establish the rate of generation, total quantities, and cost of collection and/or disposal, for residential, commercial and industrial wastes handled by municipalities and private agencies across the province.

DESCRIPTION:

This is the second phase of a comprehensive study to develop a system for measuring the total amount of urban solid waste generated in Ontario, its constitution by separable fractions, the costs of collection and disposal in dollars, energy, labour and social terms, and the subsequent implementation and monitoring of the system as a means of assessing waste management performance.

DURATION  
OF PROJECT

1 YEARS

PRESENT  
YEAR IS

Final YEAR

REPORTING  
DATE December 1977

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
61,000

CURRENT YEAR  
61,000

MAN YEARS

TOTAL PROJECT  
Not known

SOURCE OF  
FUNDS:

REGULAR X  
WORK PROGRAM

SPECIAL  
MINISTRY FUNDING

JOINTLY  
FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED?

Yes, dated December 1977

PARTICIPATION BY OTHER MINISTRIES:

T.E.I.G.A.

REMARKS:

The system has been developed with the cooperation of six municipalities in Ontario of various sizes having varying waste management systems in effect.



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management Advisory Board DATE: Dec. 16, 1977

PROJECT TITLE: An Evaluation of the Employment Impacts for  
Seven Policy Alternatives

KEY WORDS: Soft Drink Packaging, Ontario Legislation  
for Carbonated Soft Drinks

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Professor M.J. Hare

LIAISON OFFICER  
OR SUPERVISOR P. J. Crabtree

RESEARCH CATEGORY: INTERNAL ☐ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☒ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To assess the direct and indirect employment impacts  
associated with seven policy alternatives, including  
the integrated policy package selected by the Ontario  
Government.

DESCRIPTION: This report analyses the employment changes in Ontario  
that could be expected, particularly in the first year  
adjustment, for each of the following seven policy  
options: -  
1. Immediate ban  
2. Phased ban (over five years)  
3. Mandatory deposit - return through retailers  
4. Mandatory deposit - return through depots  
5. Government's program, including 5¢ tax on cans  
6. Voluntary program proposed by industry  
7. Government's program, including 2¢ tax on cans

DURATION OF PROJECT:  $\frac{1}{2}$  YEARS PRESENT YEAR IS Final YEAR REPORTING DATE: October 1977

BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	7,000	7,000	$\frac{1}{2}$	$\frac{1}{2}$
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING <input type="checkbox"/>	JOINTLY FUNDED PROJECT <input type="checkbox"/>	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED? Yes, October 1977.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Waste Management Advisory Board

DATE: Dec. 16, 1977

PROJECT TITLE:

Non-Carbonated Soft Drink Packaging in Ontario

KEY WORDS:

Soft Drink Packaging, Non-Carbonated

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Professor M.J. Hare

LIAISON OFFICER  
OR SUPERVISOR

P. J. Crabtree

RESEARCH  
CATEGORY:

INTERNAL —  
GRANT —

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT X —

MULTI-YEAR PROJECT —  
CONCURRENT PROJECT —

**OBJECTIVE:** To present a state-of-the-art report on all primary and secondary packaging of non-carbonated soft drinks in Ontario including a definition of the industry, sales trends, estimated environmental impact from existing packaging, and an assessment of the Saskatchewan experience. Also, to analyse the potential substitution effect of non-carbonated soft drinks entering the carbonated soft drink market, and also highlight principal areas that merit future investigation, all in the form of recommendations.

**DESCRIPTION:**

The report will provide: -

- a) a comprehensive definition of those products to be covered by the study (e.g., fruit juices, fruit drinks, etc.)
- b) market share of sales for each category of beverage and trend analysis
- c) an estimate of levels of solid waste, litter, resource depletion and energy consumption generated from sales of non-carbonated soft drinks in Ontario in 1975
- d) an assessment of the impact in Saskatchewan on soft drink sales (including vending sales) when the ban on carbonated soft drink cans was introduced; legislation on NCSD in other jurisdictions
- e) assessment of impact of substituting non-carbonated soft drinks for carbonated soft drinks

DURATION  
OF PROJECT

1/4 YEARS

PRESENT  
YEAR IS

Final YEAR

REPORTING  
DATE

December 1977

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
5,000

CURRENT YEAR  
5,000

TOTAL PROJECT  
1/4

CURRENT YEAR  
1/4

SOURCE OF  
FUNDS:

REGULAR  
WORK X  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED —  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Yes, December 1977

PARTICIPATION BY OTHER MINISTRIES:

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REMARKS:





RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management Advisory Board DATE: Dec. 16, 1977

PROJECT TITLE: Environmental Impact Study of Fluid Milk Containers

KEY WORDS: Milk, Environmental Impacts

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Giles Endicott, Research Associate with W.M.A.B.

LIAISON OFFICER  
OR SUPERVISOR P. J. Crabtree

RESEARCH CATEGORY: INTERNAL X GRANT — UNSOLICITED CONTRACT — SOLICITED CONTRACT — MULTI-YEAR PROJECT — CONCURRENT PROJECT —

OBJECTIVE: To develop policy recommendations which will reduce the adverse environmental impacts associated with milk packaging.

DESCRIPTION: The weight, volume of waste, and energy use are being determined and compared in absolute terms and per unit of milk delivered. Sales trends by container types are being examined. Photodegradation of nutrients will be considered and recommendations made. A report will be made to the Minister of the Environment in time to affect metric conversion slated for July 1978.

DURATION OF PROJECT	<u>1½</u> YEARS	PRESENT YEAR IS	<u>Final</u> YEAR	REPORTING DATE	<u>November 1977</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	20,000	5,000	1	1/4	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY <u>—</u> FUNDING	JOINTLY FUNDED <u>—</u> PROJECT	OTHER <u>—</u>	

IS A REPORT ANTICIPATED? Consultant's Report, dated June 1977.

PARTICIPATION BY OTHER MINISTRIES: Consultation with Agriculture and Food, Health and Energy

REMARKS: The photodegradation effects of light on milk in the container types investigated were examined in a separate report carried out by Dr. J.M. de Man (Guelph University). Subsequent to completion of the Board's report, comments were sought from interested sections of the industry, retailers and conservation groups, and these have been summarised in the Board's report and recommendations to the Minister.



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH:

Waste Management Advisory Board

DATE:

PROJECT TITLE:

Wine and Spirits Packaging In Ontario

KEY WORDS:

Wine and Spirits

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Stevenson & Kellogg Ltd., Management Consultants

LIAISON OFFICER  
OR SUPERVISOR

P. J. Crabtree

RESEARCH  
CATEGORY:

INTERNAL —  
GRANT —

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT ☒

MULTI-YEAR PROJECT —  
CONCURRENT PROJECT —

OBJECTIVE:

To identify the means of reducing the adverse environmental impacts of wine and spirits packaging, including their contribution to solid waste and litter and resource/energy depletion.

DESCRIPTION:

A comprehensive assessment of the environmental, economic and other factors associated with different possible container types and end-use systems for wine and spirits packaging in Ontario. The end-use systems analysed were disposal, recycling (return to L.C.B.O. depots) and re-use. The study presents a unique assessment of the relative environmental, physical, health and other attributes for ten possible container types.

Subsequent to the completion of the report, comments were sought from interested sections of the industry and environmental organizations; these comments have been summarized in the Board's report and recommendations to the Minister.

DURATION  
OF PROJECT

1½ YEARS

PRESENT  
YEAR IS

— YEAR

REPORTING  
DATE

October 1976

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
80,700

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR ☒  
WORK PROGRAM

SPECIAL  
MINISTRY FUNDING

JOINTLY  
FUNDED PROJECT  
OTHER

IS A REPORT ANTICIPATED?

Yes, received in October 1976

PARTICIPATION BY OTHER MINISTRIES:

L.C.B.O.

REMARKS:

Further work by Stevenson & Kellogg Ltd. has been commissioned to assess the costs involved in establishing a redemption/recycling system using L.C.B.O. outlets as the point for bottle return.





Ontario

BRANCH:

Waste Management Advisory Board

DATE:

PROJECT TITLE:

Development of Environmental Guidelines for  
Packaging of Consumer Products

KEY WORDS:

Packaging, Environmental Guidelines

PRINCIPLE INVESTIGATOR  
AND AFFILIATIONLIAISON OFFICER  
OR SUPERVISOR

P. J. Crabtree

RESEARCH  
CATEGORY:INTERNAL —  
GRANT —UNSOLICITED CONTRACT —  
SOLICITED CONTRACT ☒MULTI-YEAR PROJECT —  
CONCURRENT PROJECT —

OBJECTIVE:

To develop guidelines defining the environmental  
criteria that are to be considered in the design  
of a package or packaging system.

DESCRIPTION:

The project will provide:

1. a refined version of environmental  
packaging guidelines for consumer  
products;
2. the integration of these refined guide-  
lines to waste management goals;
3. the development of background information  
for each guideline (or set of guidelines)  
sufficient for industry and other interested  
parties. Included in this section will be  
a discussion of the feasibility of setting  
goals for the proportion of renewable and  
non-renewable resources and for the proportions  
that can be re-used or recycled.

DURATION  
OF PROJECT

— YEARS

PRESENT  
YEAR IS

— YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

14,000

12,000

MAN YEARS

TOTAL PROJECT CURRENT YEAR

2/3

1/2

SOURCE OF  
FUNDS:REGULAR ☒  
WORK —  
PROGRAMSPECIAL  
MINISTRY —  
FUNDINGJOINTLY  
FUNDED —  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Interim report by March 31/78.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

BRANCH:

Waste Management Advisory Board

DATE: Dec. 16, 1977

PROJECT TITLE:

Evaluation of Environmental Characteristics  
of Packaging Materials

KEY WORDS:

Packaging, environmental characteristics

PRINCIPLE INVESTIGATOR  
AND AFFILIATIONLIAISON OFFICER  
OR SUPERVISOR

P. J. Crabtree

RESEARCH  
CATEGORY:INTERNAL —  
GRANT —UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —X  
SOLICITED CONTRACT —X CONCURRENT PROJECT —

OBJECTIVE:

To identify and develop environmental characteristics for the major packaging materials, and to investigate the impact of these characteristics on a selected number of packages and packaging systems.

DESCRIPTION:

The project will collect and develop (when necessary) the environmental attributes for the basic packaging materials, and for a number of representative packages and packaging systems.

Further environmental input will be obtained for each major packaging material (e.g. embodied energy content, renewable versus non-renewable resource input, technological aspects of recycling potential).

In another dimension, the specific package and the package system become important. In this content, packaging will include primary, secondary and tertiary packaging for consumer products. The project will identify which consumer product sectors generate significant levels of solid waste.

DURATION  
OF PROJECT

2+ YEARS

PRESENT  
YEAR IS

First YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

23,000

7,000

1

1/3

SOURCE OF  
FUNDS:REGULAR  
WORK —X  
PROGRAMSPECIAL  
MINISTRY —  
FUNDINGJOINTLY  
FUNDED —  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

Interim report by March 31, 1978.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Waste Management Advisory Board DATE:

PROJECT TITLE: Identification and Selection of Package Systems  
Suited to Standard Re-usable Applications

KEY WORDS: Packaging, Standard Re-usable Applications

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

LIAISON OFFICER  
OR SUPERVISOR P. J. Crabtree

RESEARCH CATEGORY: INTERNAL ——— UNSOLICITED CONTRACT ——— MULTI-YEAR PROJECT X  
GRANT ——— SOLICITED CONTRACT X CONCURRENT PROJECT ———

OBJECTIVE:  
To identify specified package areas where environ-  
mental gains can be achieved through the introduction  
of re-usable (or standard re-usable) packages or  
containers.

DESCRIPTION:  
It is the purpose of this study to identify areas  
of consumer packaging where the reduction-at-source  
technique of re-usability could be environmentally  
desirable. In this context, consumer packaging is  
to include all aspects, i.e. primary, secondary  
and tertiary packaging.

DURATION OF PROJECT	2 YEARS	PRESENT YEAR IS	First YEAR	REPORTING DATE
BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	15,000	5,000	3/4	1/4
SOURCE OF FUNDS:	REGULAR WORK PROGRAM <u>X</u>	SPECIAL MINISTRY FUNDING ———	JOINTLY FUNDED PROJECT ———	OTHER ———

IS A REPORT ANTICIPATED? Interim report by March 31, 1978.

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH:

Waste Management Advisory Board

DATE: Dec. 16, 1977

PROJECT TITLE:

Home Composting Program

KEY WORDS:

Source Separation - Home Composting

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

J. Wendy Cook, Giles Endicott, W.M.A.B. Staff

LIAISON OFFICER  
OR SUPERVISOR

P. J. Crabtree

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT ☐

UNSOLICITED CONTRACT ☐  
SOLICITED CONTRACT ☐

MULTI-YEAR PROJECT ☒  
CONCURRENT PROJECT ☐

OBJECTIVE:

1. By placing a home composter in a selected group of households, to measure the actual effects and attitudinal changes as compared to a control group
  - a) in the reduction of food and yard wastes
  - b) in the reduction of other waste resulting from an increased awareness of environmental matters.
2. To provide policy guidance with respect to a large fraction of the residential waste stream, i.e. 30-35%

DESCRIPTION:

- The first stage, conducted during the summer of 1977, included:
- the selection of two residential areas close to one another, and in a similar socio-economic bracket -- one of which is a "control" group,
  - the weighing of refuse from the homes of the one group participating in the program,
  - an attitudinal and practical survey of each household in both groups,
  - the installation of composters in the homes of one of the two groups.

The program will provide data on: -

- a) the willingness of householders to participate in this type of activity,
- b) the persistence of those participating in keeping the composters in use in all seasons,
- c) the extent to which the quantity of domestic waste being put out for collection can be reduced.

DURATION  
OF PROJECT

— 2 — YEARS

PRESENT  
YEAR IS

First YEAR

REPORTING  
DATE

Sept. 1978

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT  
36,000

CURRENT YEAR  
8,000

TOTAL PROJECT  
4

CURRENT YEAR  
3/4

SOURCE OF  
FUNDS:

REGULAR  
WORK ☒  
PROGRAM

SPECIAL  
MINISTRY ☐  
FUNDING

JOINTLY  
FUNDED ☐  
PROJECT

OTHER ☐ Student  
Programs

IS A REPORT ANTICIPATED?

Interim report, Dec. 1977 and final report Sept. 1978

PARTICIPATION BY OTHER MINISTRIES:

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REMARKS:

The second stage will involve a return to the same group of households in the summer of 1978 to verify the continuing effects and establish quantitative data.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: Radioactivity and Waste Heat Monitoring

KEY WORDS: Radioactivity, heat, remote sensing

PRINCIPLE INVESTIGATOR  
AND AFFILIATION D. I. Ross, A. James

LIAISON OFFICER  
OR SUPERVISOR J. D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: Maintain surveillance of waterborne radionuclide levels off the mouth of the Serpent River, Port Hope, Pickering G.S., Bruce "A" G.S. and Douglas Point G.S. Map the waste heat plume off the Bruce "A" generating stations on Lake Huron and further develop in-situ plume tracking capabilities.

DESCRIPTION: Previous reports on waterborne radionuclide status in Serpent Harbour and Port Hope indicated that  $^{226}\text{Ra}$  levels are periodically approaching or exceeding the Ministry criterion for public water supply. The IJC has requested upgraded surveillance at these and other locations where radioactive releases exist.

There is also a need for improved understanding of thermal plume characteristics at nuclear generating stations. A 1976 OMOE report identified the utility of airborne thermal infrared remote sensing and the need for better in-situ plume tracking techniques.

Radioactivity sampling will encompass sampling grids located within the "source control area" of the discharges from the Bruce "A" G.S., Douglas Point G.S., Pickering G.S., Serpent River, Port Hope, Port Granby dump and Welcome dump.

Thermal plume mapping of the Bruce "A" G.S. waste heat discharge will involve monthly airborne thermal infrared scanning flights, as well as simultaneous ground measurements. Remote sensing services will be obtained from CCRS, Ottawa. The Hearn G.S. in Toronto Harbour will be the site of developmental work in the area of in-situ plume tracking. Additional conventional in-situ water quality sampling will be undertaken at the Serpent Harbour, BNPD and Pickering G.S. sites.

DURATION OF PROJECT	(Ongoing) YEARS	PRESENT YEAR IS	10 YEAR	REPORTING DATE	see below
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		\$111,000		2.4	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<input checked="" type="checkbox"/>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED? See below

PARTICIPATION BY OTHER MINISTRIES: Ontario Centre Remote Sensing, OMNR, Occupational Health Protection Branch, Ministry of Labour

REMARKS: Radioactivity surveillance data will be evaluated with reports being circulated to Head Office and regional staff, as well as providing input to the Annual Report of the Radioactivity Subcommittee (IJC).

Thermal plume maps for the Bruce "A" G.S. will be presented to Head Office and Southwestern Region assessment staff as data becomes available and a summary prepared. An internal field procedure manual will be completed on in-situ plume tracking techniques.





RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: Toronto Harbour

KEY WORDS: Trace contaminants, water quality, sediments

PRINCIPLE INVESTIGATOR  
AND AFFILIATION W. Richardson

LIAISON OFFICER  
OR SUPERVISOR J. D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: Identify discharges entering the harbour and mapping out zones of influence under various meteorological conditions through water quality studies.  
Determine whether trace contaminants such as heavy metals, PCB's, Mirex and DDT are biomagnified in the food chain of the harbour aquatic ecosystem.

DESCRIPTION: Five monthly cruises will be carried out in the Inner and Outer Toronto Harbours and adjacent areas.  
Weekly sampling at designated locations and major discharges will include operation of recording water quality and current meters.  
Analyses will include nutrient, public health bacterial parameters, biomass indicator, heavy metals and polycyclic aromatic hydrocarbons.  
Biomagnification of heavy metals, Mirex, PCB's and DDT's will be investigated.

DURATION OF PROJECT	Annually	YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE	Annually
BUDGET:	TOTAL DOLLARS		MAN YEARS			
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR		
		\$137,000		6.6		
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER		

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: Batchawana Bay

KEY WORDS: Enrichment, bacterial contamination

PRINCIPLE INVESTIGATOR  
AND AFFILIATION N. D. Herzog

LIAISON OFFICER  
OR SUPERVISOR J. D. Kinkad

RESEARCH CATEGORY: INTERNAL ~~X~~ — UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
GRANT — SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: Assess present water quality conditions and identify sources of bacterial contamination in view of recreational use of these waters during the summer.

DESCRIPTION: Studies in 1973 identified bacterial contamination and elevated nutrient levels in this embayment.

A one week survey is planned to evaluate sources of bacterial contamination and determine the present trophic status.

DURATION OF PROJECT	<u>1</u> YEARS/	PRESENT YEAR IS	YEAR	REPORTING DATE	<u>Spring, 1978</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		\$20,000		.5	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED	OTHER	

IS A REPORT ANTICIPATED? yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: November 10, 1977

## PROJECT TITLE:

Thunder Bay

KEY WORDS: Nutrients, dissolved oxygen, bacterial contamination

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N. D. Herzog

LIAISON OFFICER  
OR SUPERVISOR

J. D. Kinhead

RESEARCH  
CATEGORY:INTERNAL X  
GRANT —UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: To determine compliance with MOE criteria and IJC objectives for water quality. To determine the effectiveness of remedial programs and the need for further abatement measures.

To complement the existing data base with respect to the effects of waste discharges on water quality with particular emphasis on nearshore nutrient levels and bacterial quality.

## DESCRIPTION:

Studies carried out by the Ministry in 1973 and 1974 identified a number of problems associated with industrial and municipal discharges. These included bacterial contamination, oxygen depletion, fish tainting, nutrient enrichment and mercury accumulation in fish and sediment. Process changes and/or improved treatment is scheduled for completion or partial completion at Great Lakes Paper Company, Canada Malting Limited, Industrial Grain Products Limited and at the City of Thunder Bay STP during 1977.

This year's program will include an intensive survey during which approximately 50 locations will be monitored to determine existing water quality conditions within the harbour. Emphasis in these studies will be placed on nutrient measurements and bacteriological parameters.

DURATION  
OF PROJECT1 YEAR\$

## PRESENT

YEAR IS

— YEAR

REPORTING  
DATESpring, 1978

## BUDGET:

## TOTAL DOLLARS -

TOTAL PROJECT

CURRENT YEAR

\$50,000

## MAN YEARS

TOTAL PROJECT

CURRENT YEAR

1.2

SOURCE OF  
FUNDS:REGULAR  
WORK X  
PROGRAMSPECIAL  
MINISTRY —  
FUNDINGJOINTLY  
FUNDED —  
PROJECT

OTHER —

## IS A REPORT ANTICIPATED?

Yes

## PARTICIPATION BY OTHER MINISTRIES:

## REMARKS:





## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: St. Marys River Monitoring

KEY WORDS: Nutrients, phenols, cyanide,

PRINCIPLE INVESTIGATOR  
AND AFFILIATION N. D. HerzogLIAISON OFFICER  
OR SUPERVISOR J. D. KinheadRESEARCH CATEGORY: INTERNAL X GRANT ——— UNSOLICITED CONTRACT ——— SOLICITED CONTRACT ——— MULTI-YEAR PROJECT ——— CONCURRENT PROJECT ———

OBJECTIVE: Assess the adequacy of current remedial programs in upgrading river water quality.

DESCRIPTION: Field studies will be undertaken along the Ontario shoreline of the lower river downstream from Algoma Steel and municipal discharges during six cruises on monthly interval from May to October. Analysis will focus on phenol, cyanide and bacterial parameters. Effluent bioassays will be conducted at Algoma Steel under a separate program.

DURATION OF PROJECT	Annually YEARS	PRESENT YEAR IS	11 YEARS	REPORTING DATE	Annually
BUDGET:	TOTAL DOLLARS -		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		\$80,000		1.9	
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<u>X</u>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER

IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: Lake Erie

KEY WORDS: Nutrients, enrichment, water quality, mercury

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Y. h. handy and D. I. RossLIAISON OFFICER  
OR SUPERVISOR J. D. KinheadRESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: Provide an input to the Grand River Basin Management Study in the area of nutrient controls.

Maintain surveillance of the impact of Haldimand and Norfolk area development and provide input to the long-term fish study being undertaken by MNR.

Define the response of phytoplankton growth to nutrient distribution in Western Lake Erie and the relevance of reductions in phytoplankton biomass. Maintain surveillance of mercury levels in sediments of the Western Basin of Lake Erie.

DESCRIPTION: Previous investigations along the Ontario shoreline of Lake Erie indicated that the water quality at the Grand River mouth in the Eastern Basin was characterized by high nutrient levels sufficient to promote algal blooms. It was also observed that reductions in phytoplankton biomass at the Kingsville Water Intake have occurred during the last decade and that these reductions exceed those expected from observed decreases in phosphorus levels. In addition, investigations in sediments of the Western Basin of the lake revealed a slight, but not significant decrease in mercury content, implying a redistribution of this contaminant in the basin. At the same time, there has been a significant decline in mercury levels in fish from the area. Under the terms of reference of Nanticoke Environmental Committee a co-operative study with MNR and Ontario Hydro has been ongoing since 1968 in the vicinity of the new Haldimand and Norfolk development.

Field studies will be conducted during April, June, August and September in Western Lake Erie and at the Grand River mouth. Water quality surveys will include depth sampling for nutrients, dissolved oxygen, temperature and biomass indicators. Tri-weekly sampling will be carried out at Nanticoke.

Mercury in sediments of Western Lake Erie will be examined during spring and fall.

DURATION (Ongoing) PRESENT 9 REPORTING (Ongoing)  
OF PROJECT YEARS YEAR IS YEARS DATEBUDGET: TOTAL DOLLARS - MAN YEARS  
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR  
\$170,000 4.4SOURCE OF FUNDS: REGULAR ☒ WORK ☐ PROGRAM SPECIAL MINISTRY ☐ FUNDING JOINTLY FUNDED ☐ PROJECT OTHER ☐

IS A REPORT ANTICIPATED? Ongoing

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: November 10, 1977

## PROJECT TITLE:

Detroit River

## KEY WORDS:

Phosphorus, loadings, public health, microbiology

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Y. H. Hamdy

LIAISON OFFICER  
OR SUPERVISOR

J. D. Kinhead

RESEARCH  
CATEGORY:INTERNAL ☒  
GRANT ☐UNSOLICITED CONTRACT ☐  
SOLICITED CONTRACT ☐MULTI-YEAR PROJECT ☐  
CONCURRENT PROJECT ☐

## OBJECTIVE:

Determine the optimum sampling frequency for developing a good estimate of the annual phosphorus load to Lake Erie from the Detroit River.

Maintain surveillance of bacterial levels from Windsor to the river mouth and relate to remedial action.

## DESCRIPTION:

In order to reasonably predict the Lake Erie response to phosphorus reductions it is necessary to have improved phosphorus loading estimates for the Detroit River. Work begun in co-operation with the Michigan Department of Natural Resources in 1975 has led to a minimization of those errors in estimating loading which are associated with vessel positioning and sample analyses. The remaining components affecting the precision of phosphorus estimates are the real variations of concentration and flow.

Within the river itself, a recent Ministry study has identified the sources of bacterial contamination along the Windsor and Amherstburg shorelines and remedial action to correct these problems is being pursued with the municipalities.

The details of the phosphorus loading study are presently being developed with Michigan DNR who have the lead role.

Public health indicator bacteria, nutrients and chlorides will be examined adjacent to the Ontario shoreline of the river in summer and fall surveys.

A summary report with recommendations for estimating loads of nutrients (and other substances), applicable to all the connecting channels, will be prepared in time for the 1978 survey season.

The status of bacterial conditions in the river will be reported to regional abatement staff.

DURATION  
OF PROJECT

(Ongoing)

YEARS

PRESENT  
YEAR IS

10

YEARS

REPORTING  
DATE

As above

## BUDGET:

TOTAL DOLLARS -

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

\$70,000

2.1

SOURCE OF  
FUNDS:REGULAR ☒  
WORK ☐  
PROGRAMSPECIAL  
MINISTRY ☐  
FUNDINGJOINTLY  
FUNDED ☐  
PROJECT OTHER ☐

## IS A REPORT ANTICIPATED?

As above

## PARTICIPATION BY OTHER MINISTRIES:

International study with Michigan Department of Natural Resources

## REMARKS:



BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: St. Clair River

KEY WORDS: Water quality, organics, sediment, mercury, fish tainting

PRINCIPLE INVESTIGATOR  
AND AFFILIATION Y. H. Hamdy and O. H. MooreLIAISON OFFICER  
OR SUPERVISOR J. D. KinheadRESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: Assess the effectiveness of remedial programs in correcting water quality problems. Maintain surveillance of mercury levels in sediments of St. Clair system.

DESCRIPTION: Previous Ministry studies have indicated improvements in water quality conditions in the river as evidenced by downward trends in chloride and dissolved solids levels. Reductions in mercury levels in sediments of the St. Clair system were also observed.

Fish tainting and potential contamination of water supplies resulting from dissolved organics discharged to the river from petrochemical industries, is currently being studied by the Ministry under a separate program. Improved treatment is scheduled for completion or partial completion at Imperial Oil Enterprises Ltd., Dow Chemical of Canada Ltd., and Polysar during 1977.

Field studies will be conducted during July and August. Samples will be analysed for chlorides. Sediment samples near industrial outfalls will be analysed for organics and PCB's.

Study findings and recommendations to be forwarded to Southwestern Region. Under existing arrangements, annual reporting of mercury trends in sediments will continue.

DURATION OF PROJECT	(Ongoing) YEARS	PRESENT YEAR IS	9th YEAR	REPORTING DATE	As above
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BUDGET:	TOTAL DOLLARS -		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
		\$60,000		2

SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK <input checked="" type="checkbox"/>	MINISTRY <input type="checkbox"/>	FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED? As above

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Associated study for organics as discussed above being conducted by Southwestern Region, London, Ontario.



Ontario

BRANCH: Water Resources

DATE: November 10, 1977

## PROJECT TITLE:

Lake Superior-Pulp Mill Discharges

## KEY WORDS:

Plumes, water quality, pulp and paper, remote sensing

PRINCIPLE INVESTIGATOR G. Lawrence (OMNR, OCRS)  
AND AFFILIATION D. I. Ross, N. D. Herzog

LIAISON OFFICER J. D. Kinhead  
OR SUPERVISOR

RESEARCH CATEGORY: INTERNAL X — UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
GRANT — SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE: Provide supporting information useful in the design and interpretation of in-situ studies of pulp mill discharges.

## DESCRIPTION:

Pulp mill effluents constitute the major portion of Ontario waste inputs to Lake Superior. The effects of these discharges on the receiving water, is strongly dependent on plume movement as it is influenced by meteorological conditions.

The proposed study involves contracting for outside services to the Ontario Center for Remote Sensing for aerial photography and air photo interpretation. It is hoped to obtain at least two flights at the following locations on Lake Superior.

American Can of Canada Limited, Marathon; Kimberly Clark of Canada Limited, Terrace Bay; Domtar Packaging Limited, Red Rock; Abitibi Provincial Mill, Thunder Bay; Abitibi Mission Mill, Thunder Bay.

The use of Landsat digital computer tapes is also being investigated as a supplemental data source.

DURATION OF PROJECT	<u>1</u> YEAR\$	PRESENT YEAR IS	— YEAR	REPORTING DATE	Mid-1978
BUDGET:	\$20,000	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	MAN YEARS CURRENT YEAR
				.5	
SOURCE OF FUNDS:	REGULAR WORK <u>X</u> PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	

IS A REPORT ANTICIPATED? Yes

## PARTICIPATION BY OTHER MINISTRIES:

Ontario Centre for Remote Sensing, Ministry of Natural Resources

## REMARKS:





BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: Collingwood Harbour

KEY WORDS: Nutrients, eutrophication, water quality

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

D. I. Ross, Y. H. Hamdy

LIAISON OFFICER  
OR SUPERVISOR

J. D. Kinhead

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: Provide additional water quality information required to assess the need for further remedial measures.

## DESCRIPTION:

Past water quality reports (1974, 1976) have indicated that Collingwood Harbour is eutrophic as a result of phosphorus loadings from the municipal STP. Phosphorus removal was initiated in 1975 at the treatment plant but may not be adequate in controlling aquatic plant growths in the harbour because of the restricted nature of the harbour (1976 report). The municipality has been requested by Central Region to investigate the addition of secondary treatment at this plant.

Field studies will be carried out in July and September during 3-day surveys. Water quality analyses include nutrients, biomass indicators, and health-oriented bacterial parameters.

DURATION OF PROJECT (Ongoing) YEARS PRESENT YEAR IS 3 YEAR REPORTING DATE Spring, 1978

BUDGET: TOTAL DOLLARS - TOTAL PROJECT CURRENT YEAR \$17,000 MAN YEARS TOTAL PROJECT CURRENT YEAR .8

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED? Internal MOE interim report

PARTICIPATION BY OTHER MINISTRIES:

REMARKS: Study will be supplemented by data from the self-help program sponsored by Central Region.



BRANCH: Water Resources

DATE: November 10, 1977

## PROJECT TITLE:

MacGregor Bay, North Channel

## KEY WORDS:

Water quality, pH, acidification, acid rain, heavy metals

## PRINCIPLE INVESTIGATOR

## AND AFFILIATION

D. I. Koss and Y. H. Hamdy

## LIAISON OFFICER

## OR SUPERVISOR

J. D. Kinhead

## RESEARCH

## CATEGORY:

INTERNAL XGRANT     UNSOLICITED CONTRACT      MULTI-YEAR PROJECT     SOLICITED CONTRACT      CONCURRENT PROJECT     

## OBJECTIVE:

Determine the nature and extent of acidity problems in embayments along the northeastern portion of the North Channel and the northwestern portion of Georgian Bay.

## DESCRIPTION:

In fall 1976, a report was received from the Lake Huron Fisheries Assessment Unit, Ministry of Natural Resources, Owen Sound. This report suggested that pH suppression resulting from atmospheric fallout (Sudbury smelter plume) may be responsible for the disappearance of young walleye in the MacGregor Bay area.

Field studies will be carried out during spring melt and summer periods.

Water quality analyses will include the determination of the buffering capacity of the embayments.

Study findings will be reviewed with Ministry staff working on Sudbury Environmental Study and with the Ministry of Natural Resources and recommendations made as necessary.

DURATION  
OF PROJECT1 YEARSPRESENT  
YEAR IS1 YEARREPORTING  
DATESpring, 1978

## BUDGET:

## TOTAL DOLLARS -

## MAN YEARS

## TOTAL PROJECT

## CURRENT YEAR

## TOTAL PROJECT

## CURRENT YEAR

\$23,000

.8

SOURCE OF  
FUNDS:

## REGULAR

WORK X

## PROGRAM

## SPECIAL

MINISTRY     

## FUNDING

## JOINTLY

FUNDED     

## PROJECT

OTHER     

## IS A REPORT ANTICIPATED?

As above

## PARTICIPATION BY OTHER MINISTRIES:

Lake Huron Fisheries Assessment Unit, Ministry of Natural Resources, Owen Sound

## REMARKS:



Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December 9, 1977

PROJECT TITLE:

Limnological Effects on Mercury Concentrations in Fish

KEY WORDS:

Fish, Mercury, Limnology

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

W. Kennedy

LIAISON OFFICER  
OR SUPERVISOR

\*P.J. Dillon

RESEARCH  
CATEGORY:

INTERNAL X  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine from available data what limnological features of lakes affects the mercury concentrations in fish.

DESCRIPTION:

Mercury concentration in fish from a wide variety of lakes are examined in terms of the limnological characteristics of the lakes. Possible causative and control theories are developed for further field testing.

DURATION  
OF PROJECT

1 YEARS

PRESENT  
YEAR IS

1 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT CURRENT YEAR  
10K

MAN YEARS

TOTAL PROJECT CURRENT YEAR  
1/2

SOURCE OF  
FUNDS:

REGULAR  
WORK —  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





Ministry of the  
Environment

WR-13

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December 8, 1977

PROJECT TITLE:

Eurasian milfoil diseases

KEY WORDS:

Eurasian milfoil, growth, diseases

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Mrs. I. Wile, Ministry of the Environment

LIAISON OFFICER

OR SUPERVISOR

RESEARCH

CATEGORY:

INTERNAL X  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the cause of decreases in growth of Eurasian milfoil (Myriophyllum spicatum)

DESCRIPTION:

Milfoil growth has decreased in some lakes in Ontario. The plants have had symptoms of a disease. The research is designed to confirm or deny the presence of the disease and explore other factors which could affect milfoil growth.

DURATION  
OF PROJECT

on-going YEARS

PRESENT  
YEAR IS

YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

17,000

1

SOURCE OF  
FUNDS:

REGULAR  
WORK X  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

YES

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December 8, 1977

PROJECT TITLE:

Utilization of Aquatic Plants

KEY WORDS:

Aquatic Plants, Compost

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Mr. J.H. Neil, Limnos Limited

LIAISON OFFICER  
OR SUPERVISOR

Mrs. I. Wile, Ministry of the Environment

RESEARCH  
CATEGORY:

INTERNAL —  
GRANT —

UNSOLICITED CONTRACT X MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To develop detailed methodology for preparing compost from aquatic plants

DESCRIPTION:

Aquatic plants are mixed with paper in varying quantities and put through a rapid-rate composter. The compost will be tested under greenhouse conditions.

DURATION  
OF PROJECT

1 YEARS

PRESENT  
YEAR IS

1 YEAR

REPORTING  
DATE

March 1978

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT	CURRENT YEAR
\$17,500	

MAN YEARS

TOTAL PROJECT	CURRENT YEAR

SOURCE OF  
FUNDS:

REGULAR  
WORK X  
PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Some of the work is carried out at the University of Guelph under sub-contract to Limnos Limited.



BRANCH: Water Resources

DATE: December 8, 1977

PROJECT TITLE:

Pesticides and Metals in Great Lakes Fish

KEY WORDS:

Pesticides, Metals, Fish

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

K. Suns, Limnology & Toxicity Section, Water Resources Branch

LIAISON OFFICER  
OR SUPERVISOR

G. Craig

RESEARCH  
CATEGORY:

INTERNAL X  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

This is a PLUARG study to determine the effects of pesticides and metals from rivers on fish in the Great Lakes.

DESCRIPTION:

The project includes data collection and tabulation and collection of more data if required.

DURATION  
OF PROJECT

2 YEARS

PRESENT  
YEAR IS

2 YEAR

REPORTING  
DATE

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT

CURRENT YEAR

30

15

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

2

1

SOURCE OF  
FUNDS:

REGULAR X  
WORK PROGRAM

SPECIAL  
MINISTRY —  
FUNDING

JOINTLY  
FUNDED IJC  
PROJECT

OTHER —

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December 8, 1977

PROJECT TITLE:

Project Quinte

KEY WORDS:

Phytoplankton, nutrients, primary production

PRINCIPLE INVESTIGATOR

AND AFFILIATION

G. Robinson

LIAISON OFFICER

OR SUPERVISOR

P.J. Dillon

RESEARCH

CATEGORY:

INTERNAL ☒  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

Determine the response of the aquatic ecosystem to the phosphorus-removal program at municipal sewage treatment plants in the Bay of Quinte area. The work is being carried out as part of a larger multi-agency (MOE, CCIW, MNR, Queen's University and University of Guelph) study.

DESCRIPTION:

Samples for phytoplankton, chlorophyll a, nutrients and a number of other chemical parameters are collected weekly from early May until mid-October at eight stations within the bay. In addition, primary production (using the dissolved oxygen technique), incident light, and temperature profiles are measured concurrently. Phytoplankton results are expressed in terms of total cell volume and areal standard units.

DURATION OF PROJECT	Continuing	PRESENT YEAR IS	YEAR	REPORTING DATE	Annually
<hr/>					
BUDGET:	TOTAL DOLLARS			MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR		TOTAL PROJECT	CURRENT YEAR
		30			1½
<hr/>					
SOURCE OF FUNDS:	REGULAR WORK	SPECIAL MINISTRY	JOINTLY FUNDED	OTHER	
	PROGRAM	FUNDING	PROJECT		
	X	—	—	—	

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

MOE 1293 6/76



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December 8, 1977

PROJECT TITLE:

Lake Restoration

KEY WORDS:

Lake, Management, Weed Harvesting, Destratification,  
Nutrient Inactivation

PRINCIPLE INVESTIGATOR

I. Wile

AND AFFILIATION

G. Robinson

LIAISON OFFICER

I. Wile

OR SUPERVISOR

G. Robinson

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT —

CATEGORY:

GRANT —

SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To develop techniques for reclamation and management of lakes and ponds:

- (a) Aquatic weed harvesting
- (b) Destratification of lakes

DESCRIPTION:

- (a) Aquatic weeds are removed from a large area of Lake Chemung to improve aesthetics, fishing and to control eutrophication by removing plant nutrients.
- (b) Three lakes are under intensive study to determine the effects of destratification on water quality and fish production.

DURATION  
OF PROJECT

continuing YEARS

PRESENT

YEAR IS

— YEAR

REPORTING

DATE

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

100K

4

SOURCE OF

REGULAR

SPECIAL

JOINTLY

FUNDS:

WORK ☒

MINISTRY

FUNDED

OTHER

PROGRAM

FUNDING

PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Some aspects are under joint study by the Ministry of Natural Resources

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: December 8, 1977

PROJECT TITLE: Lakeshore Capacity

KEY WORDS: Lakes, Development, Capacity Limits

PRINCIPLE INVESTIGATOR P. Dillon  
AND AFFILIATION D. Jeffries

LIAISON OFFICER P. Dillon  
OR SUPERVISOR D. Jeffries

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:  
To quantify the effects of lakeshore development on lake water quality

DESCRIPTION:  
Several developed and undeveloped lakes are being surveyed to define water quality and nutrient budgets. Changes will be made on the undeveloped lakes to simulate various aspects of development in order to measure the effects on water quality

DURATION OF PROJECT	<u>5</u> YEARS	PRESENT YEAR IS	<u>3</u> YEAR	REPORTING DATE	<u>March 1980</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
		184,000			
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER	<input checked="" type="checkbox"/> Housing

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:  
These other aspects are under study by the Laboratory and the Ministry of Natural Resources



Ministry of the  
Environment

Ottawa

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December, 1977

PROJECT TITLE:

S.E.S. - Substance Budgets

KEY WORDS: hydrologic budgets, substance budgets, acidification rates, rates of recovery. Middle, Hannah, Lohi, Clearwater, Nelson Lakes

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N. Yan, Limnology & Toxicity

LIAISON OFFICER  
OR SUPERVISOR

P. Dillon

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒   
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To model acidification rates, expected duration of treatments and recovery rates of acidified lakes following reduced inputs of strong acids.

DESCRIPTION:

Stream controls have been constructed in and continuous water level recorders placed in inlets and outlets of Middle, Hannah, Lohi, Clearwater and Nelson Lakes. Data from these and precipitation gauge will be used to construct hydrologic budgets for the five lakes. These data and chemical data will be used to construct models.

DURATION  
OF PROJECT

5 YEARS

PRESENT  
YEAR IS

3 YEAR

REPORTING  
DATE March, 1980

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
400

CURRENT YEAR  
80 K

MAN YEARS

TOTAL PROJECT  
10

CURRENT YEAR  
2-1/2

SOURCE OF  
FUNDS:

REGULAR  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☒  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes, no specific date

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:




 Ministry of the  
Environment

## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December/77

PROJECT TITLE:

SES - extensive lake resurveys

KEY WORDS:

 PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N. Yan

 LIAISON OFFICER  
OR SUPERVISOR

P. Dillon

RESEARCH	INTERNAL <input checked="" type="checkbox"/>	UNSOLICITED CONTRACT <input type="checkbox"/>	MULTI-YEAR PROJECT <input checked="" type="checkbox"/>
CATEGORY:	GRANT <input type="checkbox"/>	SOLICITED CONTRACT <input type="checkbox"/>	CONCURRENT PROJECT <input type="checkbox"/>

OBJECTIVE:

Continued monitoring of chemistry of selected lakes of 'critical' pH or buffering capacity sampled from 1973-1975. Extensive lakes survey

DESCRIPTION:

In October 1977, 11 lakes from the 1973-1975 Extensive Lakes Survey were resampled by airplane

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>March, 1980</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	30K	9K	1	1/10
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK <input type="checkbox"/>	MINISTRY <input checked="" type="checkbox"/>	FUNDED <input type="checkbox"/>	OTHER <input type="checkbox"/>
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED? Yes, 1980-81

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



BRANCH: Water Resources

DATE: December, 1977

PROJECT TITLE:

S.E.S. - Reacidification of Lohi Lake

KEY WORDS:

acidification, chemistry, biology, Lohi Lake

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N. Yan

LIAISON OFFICER  
OR SUPERVISOR

RESEARCH  
CATEGORY:

INTERNAL ☒ —  
GRANT —

UNSOLICITED CONTRACT —  
SOLICITED CONTRACT —

MULTI-YEAR PROJECT ☒ —  
CONCURRENT PROJECT —

OBJECTIVE:

to document chemical and biologic changes that accompany reacidification of a lake

DESCRIPTION:

Lohi Lake was neutralized once per year in 1973, 1974 and finally in 1975. The lake pH and buffering capacity are currently declining, and changes that accompany the decline are being monitored

DURATION  
OF PROJECT

4 YEARS

PRESENT  
YEAR IS

2 YEAR

REPORTING  
DATE

March, 1980

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

60K

15K

2

1/2

SOURCE OF  
FUNDS:

REGULAR  
WORK —  
PROGRAM

SPECIAL  
MINISTRY ☒ —  
FUNDING

JOINTLY  
FUNDED — OTHER —  
PROJECT

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:


 Ministry of the  
Environment

## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December, 1977

## PROJECT TITLE:

S.E.S. - Trout Survival in Neutralized Lakes

## KEY WORDS:

Rainbow trout, Middle Lake, Lohi Lake, toxicity, copper, cages

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N Yan

LIAISON OFFICER  
OR SUPERVISOR

P. Dillon

RESEARCH	INTERNAL <u>X</u>	UNSOLICITED CONTRACT	MULTI-YEAR PROJECT <u>X</u>
CATEGORY:	GRANT	SOLICITED CONTRACT	CONCURRENT PROJECT

## OBJECTIVE:

To determine if water chemistry of Middle and Lohi Lakes after neutralization is suitable for rainbow trout survival.

## DESCRIPTION:

Cages were submerged in Middle, Lohi and Panache Lakes. Rainbow trout were planted in the cages and rates of mortality noted

DURATION OF PROJECT	<u>1</u> YEARS	PRESENT YEAR IS	<u>1</u> YEAR	REPORTING DATE	<u>March, 1978</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR
	21K	21K	1-1/2	1-1/2
SOURCE OF FUNDS:	REGULAR	SPECIAL	JOINTLY	
	WORK	MINISTRY <u>X</u>	FUNDED	OTHER
	PROGRAM	FUNDING	PROJECT	

## IS A REPORT ANTICIPATED?

Yes, March 1978

## PARTICIPATION BY OTHER MINISTRIES:

None

## REMARKS:



Ministry of the  
Environment

Ontario

RESEARCH AND DEVELOPMENT INVENTORY

WR-23

BRANCH:

Water Resources

DATE:

December, 1977

PROJECT TITLE:

S.E.S. - Nutrient Loading Studies

KEY WORDS: phosphorus, nitrogen, acid lakes, phytoplankton, zooplankton loading pH

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

N. Yan

LIAISON OFFICER  
OR SUPERVISOR

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: to study the response of increased nutrients loadings to lakes that have been neutralized (Middle, Hannah), a lake of very low pH (Mountaintop) and a lake of intermediate pH (Tower)

DESCRIPTION:

The nutrient concentrations in neutralized lakes are very low. The potential productivity may be too low to justify the cost of liming. Nitrogen and phosphorus fertilizers are added to the lake under controlled conditions and the productivity response is measured

DURATION  
OF PROJECT

5 YEARS

PRESENT  
YEAR IS

3 YEAR

REPORTING  
DATE

March, 1980

BUDGET:

TOTAL DOLLARS

MAN YEARS

TOTAL PROJECT 70K  
CURRENT YEAR 30K

TOTAL PROJECT 6  
CURRENT YEAR 2

SOURCE OF  
FUNDS:

REGULAR  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☒  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources

DATE: December, 1977

PROJECT TITLE: S.E.S. - Watershed hydrogeology

KEY WORDS: streams, hydrology, geology, Nelson Lake, substance budgets

PRINCIPLE INVESTIGATOR  
AND AFFILIATION N. Yan

LIAISON OFFICER  
OR SUPERVISOR P. Dillon

RESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: To study the effects of watershed geology on stream chemistry

DESCRIPTION:  
The gauged streams of Nelson Lake drain several different surficial and bedrock geological formations. Comparison of stream chemistry with geology will facilitate interpretation of the potential effect of acidic precipitation on lakes of different geological setting.

DURATION OF PROJECT	<u>4</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>March 1980</u>
BUDGET:	TOTAL DOLLARS		MAN YEARS		
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR	
	30K	10K	2	0.2	
SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input checked="" type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED?

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: December, 1977

PROJECT TITLE:

Long term studies of an acidic lake

KEY WORDS: acidification, Clearwater Lake, variation, chemistry, biology, annual  
variation, seasonal variation

PRINCIPLE INVESTIGATOR

AND AFFILIATION N. Yan

LIAISON OFFICER  
OR SUPERVISOR

P. Dillon

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒  
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To study long-term limnological variability of an acidic lake (Clearwater Lake)

DESCRIPTION:

Limnological monitoring of Clearwater Lake, an acidic lake near Sudbury continued in 1977. This is the longest running in-depth study of an acidic lake in the world and should serve as a yardstick against which the chemical and biological constitution of other acidic lakes can be assessed.

DURATION  
OF PROJECT

7 YEARS

PRESENT  
YEAR IS

5 YEAR

REPORTING  
DATE

March 1980

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT CURRENT YEAR

60K

20K

MAN YEARS

TOTAL PROJECT CURRENT YEAR

3

1

SOURCE OF  
FUNDS:

REGULAR  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☒  
FUNDING

JOINTLY  
FUNDED ☐ OTHER ☐  
PROJECT

IS A REPORT ANTICIPATED?

Yes, early 1978

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources

DATE: November 10, 1977

PROJECT TITLE: Assessment of Water Quality Trends and Zones of Influence in Lake Ontario

KEY WORDS: Water quality, enrichment, phosphorus

PRINCIPLE INVESTIGATOR  
AND AFFILIATION W. S. Richardson, N. D. HerzogLIAISON OFFICER  
OR SUPERVISOR J. D. KinheadRESEARCH CATEGORY: INTERNAL ☒ GRANT ☐ UNSOLICITED CONTRACT ☐ SOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐ CONCURRENT PROJECT ☐

OBJECTIVE: Assess the water quality of the nearshore zone of Lake Ontario in relation to progress in reducing phosphorus inputs. Identify sources of the trace contaminants discharged to the lake and determine the zone of influence associated with each identified source. Provide guidance to MTRCA in self-monitoring of landfill operations and development of environmentally sound site designs and filling procedures.

DESCRIPTION: Field studies will be undertaken in spring 1977 in the nearshore zone between the Niagara River and Cobourg. A system of transects extending from the shore to a 50 m depth contour will be monitored for nutrients and associated water quality parameters. In addition, two potential problem areas will be investigated in detail; i) Port Credit to Oakville area which receives discharges from four oil refineries, ii) Niagara Peninsula area which receives agricultural runoff, as well as industrial and municipal discharges. Water quality, sediments and benthos will be studied in these areas.

DURATION OF PROJECT (Ongoing) YEARS PRESENT YEAR IS 9 YEAR REPORTING DATE Annually

BUDGET: TOTAL DOLLARS TOTAL PROJECT CURRENT YEAR \$110,000 MAN YEARS TOTAL PROJECT CURRENT YEAR 4.3

SOURCE OF FUNDS: REGULAR WORK PROGRAM ☒ SPECIAL MINISTRY FUNDING ☐ JOINTLY FUNDED PROJECT ☐ OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:





1977/78 PROJECTS

BRANCH:

Water Resources

DATE:

December 15, 1977

PROJECT TITLE:

Hydrologic Models in Water Management

KEY WORDS: Hydrology, Streamflow Simulation, Parametric, Stochastic, Runoff, Snowmelt

PRINCIPLE INVESTIGATOR

AND AFFILIATION

L. A. Logan, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

F. C. Fleischer

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT

MULTI-YEAR PROJECT

CATEGORY:

GRANT

SOLICITED CONTRACT

CONCURRENT PROJECT

OBJECTIVE:

To implement, test and apply suitable hydrologic models and stochastic streamflow data generation techniques for use in water quantity and water quality management studies in southern Ontario. Present application in Grand River Water Management Study.

DESCRIPTION:

A comprehensive hydrologic model, MOEHYDR2, was developed during the International Hydrological Decade (IHD) program. Other hydrologic models, e.g. TVA, Square Grid, rainfall-runoff algorithms and snowmelt routines are being tested for use in water management programs. Statistical analysis and stochastic data generation techniques are being tested for the generation of long term hydrologic sequences (streamflow) for input to dynamic waste assimilation models, urban and agricultural runoff studies and evaluation of surface water supplies. The NWSRFS model will be calibrated and utilized for generation of streamflow data for planning purposes, where historical flow records are insufficient.

DURATION  
OF PROJECT

5

YEARS

PRESENT

3

YEAR

REPORTING  
DATE

annually

BUDGET:

TOTAL DOLLARS -

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF  
FUNDS:REGULAR  
WORK ☒  
PROGRAMSPECIAL  
MINISTRY ☒  
FUNDINGJOINTLY  
FUNDED  
PROJECT

OTHER

IS A REPORT ANTICIPATED?

technical papers and reports prepared regularly.

PARTICIPATION BY OTHER MINISTRIES:

Grand River Project - MNR, GRCA

REMARKS:

Part of present work is being conducted as part of an interdisciplinary effort (Grand River Basin Water Management Study) to develop total quality and quantity management plan for the basin.



## 1977/78 PROJECTS

BRANCH:

Water Resources

DATE: December 15, 1977

PROJECT TITLE:

Primary Productivity in River Management

KEY WORDS:

Stream biology, Nutrients, Dissolved Oxygen Models, Water Management

PRINCIPLE INVESTIGATOR

AND AFFILIATION

D. G. Weatherbe, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

F. C. Fleischer

RESEARCH

CATEGORY:

INTERNAL ☒

GRANT

UNSOLICITED CONTRACT

SOLICITED CONTRACT

MULTI-YEAR PROJECT ☒

CONCURRENT PROJECT

OBJECTIVE:

1. Using data from Grand River basin, derive characteristic growth relationships for Cladophora and Potamogeton, as governed by stream and natural environmental factors: nutrients, temperature, flow, sunlight, turbidity, substrate.

2. To develop guidelines and methodology for the regulation of nutrient levels to modify plant and algae production and effects on dissolved oxygen levels in streams.

DESCRIPTION:

- Relationships governing growth rates and river plant and algae (Cladophora, Potamogeton) are being established using field data collected in two study reaches in the Grand River watershed.

Field data: biomass, DO, temperature, flow, sunlight, reaeration, respiration, variation over growing season.

- Ecological models will be developed to simulate observed conditions. Extrapolation will be attempted to Grand River basin, knowing governing physical factors of primary production.
- Models will be incorporated into BOD-DO models.

DURATION OF PROJECT 7 YEARS PRESENT YEAR IS 6 YEAR REPORTING DATE annually

BUDGET: TOTAL DOLLARS - MAN YEARS  
TOTAL PROJECT CURRENT YEAR TOTAL PROJECT CURRENT YEAR

SOURCE OF FUNDS: REGULAR WORK PROGRAM SPECIAL MINISTRY FUNDING ☒ JOINTLY FUNDED PROJECT OTHER

IS A REPORT ANTICIPATED?

Grand River Technical Report Series

PARTICIPATION BY OTHER MINISTRIES:

REMARKS:

Research is presently part of a comprehensive basin water management study (Grand River) designed to develop a management plan for water quality, flood protection, water supply and recreation.



Ontario

## RESEARCH AND DEVELOPMENT INVENTORY

WR-29

BRANCH:

1977/78 PROJECTS

DATE:

December 15, 1977

PROJECT TITLE:

Effluent Dispersion in Shallow Rivers

KEY WORDS:

Effluent Dispersion, Mixing Zones, Modelling

PRINCIPLE INVESTIGATOR

AND AFFILIATION

H.T.P. Gowda, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

F. C. Fleischer

RESEARCH

INTERNAL ☒UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐

CATEGORY:

GRANT ☐SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

- OBJECTIVE: 1. To investigate the effects of outfall and channel hydraulic characteristics on effluent dispersion in shallow streams;
2. To develop relations between mixing zone widths and longitudinal distances, and to estimate mixing zone length using existing relationships;
3. To predict the distribution of conservative and non-conservative materials in the mixing zones under various flow conditions.
4. To develop guidelines and criteria for water quality management in mixing zones.

DESCRIPTION:

Field surveys have been carried out in selected southern Ontario streams. During each survey, transverse distributions of tracers-Rhodamine dye injected continuously at the outfall, chloride and conductivity - were measured at several transects below the outfall; depth and velocity measurements were also taken. A few of the studies were related to investigation of the distribution of chlorine residuals in streams. Transverse dispersion coefficients are determined using tracer concentration distribution curves. The attenuation of chlorine residual concentrations by the dispersion process has been evaluated using 2-dimensional, theoretical models available in literature. The effect of flow variations on the distribution of chlorine residuals in mixing zones and on concentration at an arbitrary boundary were investigated. Further investigations are being directed to model verification and guideline development.

DURATION  
OF PROJECT

— 3 — YEARS

PRESENT

YEAR IS

— 3 — YEAR

REPORTING

DATE

1978

BUDGET:

TOTAL DOLLARS -

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT CURRENT YEAR

SOURCE OF  
FUNDS:REGULAR ☒  
WORK PROGRAMSPECIAL ☒  
MINISTRY FUNDINGJOINTLY ☐  
FUNDED PROJECT OTHER ☐

IS A REPORT ANTICIPATED?

1978

PARTICIPATION BY OTHER MINISTRIES:

-

REMARKS:

Work is being conducted in part in support of water quality management programs for the Grand R. Water Management Study.



BRANCH:

1977/78 PROJECTS

DATE:

Water Resources

December 15, 1977

PROJECT TITLE:

Hamilton Harbour Study - Phase III

KEY WORDS:

Water Quality, Sediment, Harbour-Lake Exchange, Physical-Chemical Processes, Modelling, Trend Analysis

PRINCIPLE INVESTIGATOR

AND AFFILIATION

G.D. Haffner, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

M. D. Palmer

RESEARCH

CATEGORY:

INTERNAL ☒GRANT ☐UNSOLICITED CONTRACT ☐SOLICITED CONTRACT ☐MULTI-YEAR PROJECT ☐CONCURRENT PROJECT ☐

OBJECTIVE:

Continued monitoring of Hamilton Harbour water quality to assess compliance with IJC objectives and the effects of artificial mixing. Determine what further abatement programs are required for compliance. Continue work on determining water quality trends, particularly for dissolved oxygen, nutrients and phytoplankton. Measure the exchange between the harbour and Lake Ontario. Measure the water column oxygen demand and light penetration. Assess the effect of storm runoff on the harbour water quality.

DESCRIPTION:

Measurement of water quality, harbour-lake exchange, physical-chemical processes, and biological community abundance, distribution and composition.

DURATION  
OF PROJECT3 YEARSPRESENT  
YEAR IS3 YEARREPORTING  
DATEAnnually

BUDGET:

TOTAL DOLLARS -

MAN YEARS

TOTAL PROJECT

CURRENT YEAR

TOTAL PROJECT

CURRENT YEAR

SOURCE OF  
FUNDS:REGULAR  
WORK ☐  
PROGRAMSPECIAL  
MINISTRY ☐  
FUNDINGJOINTLY ☒  
FUNDED ☐  
PROJECTOTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Natural Resources, Harbour Commission, CCIW

REMARKS:



## 1977/78 PROJECTS

BRANCH:

Water Resources

DATE:

December 15, 1977

\*PROJECT TITLE:

Toronto Harbour Study

KEY WORDS:

Water Quality, Harbour-Lake Exchange, Modelling, Trend Analysis

PRINCIPLE INVESTIGATOR

AND AFFILIATION

D. J. Poulton, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

M. D. Palmer

RESEARCH

CATEGORY:

INTERNAL ☒GRANT ☐UNSOLICITED CONTRACT ☐SOLICITED CONTRACT ☐MULTI-YEAR PROJECT ☐CONCURRENT PROJECT ☐

**OBJECTIVE:** Continued monitoring of Toronto Harbour water quality to assess compliance with IJC objectives and resultant water quality from operating abatement programs. Determine what further abatement programs are required for compliance. Continue work on determining water quality trends, particularly for nutrients and phytoplankton. Assess the effect of storm runoff on the harbour water quality. Measure the exchange between the harbour and Lake Ontario.

DESCRIPTION:

Measurement of water quality, harbour-lake exchange, physical-chemical processes, and biological community abundance, distribution and composition.

DURATION OF PROJECT	<u>3</u> YEARS	PRESENT YEAR IS	<u>2</u> YEAR	REPORTING DATE	<u>Annually</u>
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BUDGET:	TOTAL DOLLARS -		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input checked="" type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>
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IS A REPORT ANTICIPATED? Yes

PARTICIPATION BY OTHER MINISTRIES:

Natural Resources, Harbour Commission, Metro Toronto

REMARKS:





BRANCH:

1977/78 PROJECTS

DATE:

December 15, 1977

PROJECT TITLE:

Nanticoke Currents and Chemistry

KEY WORDS:

Water Movement, Water Chemistry, Thermal Discharge

PRINCIPLE INVESTIGATOR

AND AFFILIATION

J. Polak, Water Modelling Section

LIAISON OFFICER

OR SUPERVISOR

M. D. Palmer

RESEARCH

INTERNAL ☒UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐

CATEGORY:

GRANT ☐SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To update the observation of changes in water movement and water chemistry resulting from the thermal discharge from the Ontario Hydro Generating Station, industrial and urban development in the Nanticoke area.

DESCRIPTION:

Recording current meters are in operation and bi-weekly sampling of water for chemical analyses is continuing.

DURATION OF PROJECT	<u>12</u> YEARS	PRESENT YEAR IS	<u>9</u> YEAR	REPORTING DATE	<u>Annually</u>
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BUDGET:	TOTAL DOLLARS		MAN YEARS	
	TOTAL PROJECT	CURRENT YEAR	TOTAL PROJECT	CURRENT YEAR

SOURCE OF FUNDS:	REGULAR WORK <input type="checkbox"/>	SPECIAL MINISTRY <input type="checkbox"/>	JOINTLY FUNDED <input checked="" type="checkbox"/>	OTHER <input type="checkbox"/>
	PROGRAM	FUNDING	PROJECT	

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

Natural Resources, Ontario Hydro

REMARKS:



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources - Hydrology and Monitoring

DATE: Jan. 5/78

PROJECT TITLE:

Drainage Basin Inventory Studies

KEY WORDS:

Basin; water-resources inventory; water management; land use planning

PRINCIPLE INVESTIGATOR

AND AFFILIATION K.T. Wang, V. Chin, D. Vallery

LIAISON OFFICER

OR SUPERVISOR U. Sibul, Head, Resource Assessment Group

RESEARCH  
CATEGORY:

INTERNAL ☒  
GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT ☒  
SOLICITED CONTRACT — CONCURRENT PROJECT —

OBJECTIVE:

To determine the inventory of surface and ground-water resources, both quantity and quality, in drainage basins in Ontario.

DESCRIPTION:

The basin inventories are designed to provide baseline water resources data and interpretation publications for future planning and water resources management in Ontario. The studies are designed to ultimately cover all of the Province on the drainage basin scale. The project involves intensive surface and ground-water data gathering and analysis to determine the integrated water resources in drainage basins. Major water uses and management alternatives are described.

DURATION OF PROJECT	On-going	PRESENT YEAR IS	— YEAR	REPORTING On an average DATE of one every 18 months (see also
BUDGET:	TOTAL DOLLARS	MAN YEARS (remarks)		
	<del>TOTAL PROJECT</del>	CURRENT YEAR \$60,000	<del>TOTAL PROJECT</del>	CURRENT YEAR 2.5
SOURCE OF FUNDS:	REGULAR <input checked="" type="checkbox"/> WORK — PROGRAM	SPECIAL MINISTRY — FUNDING	JOINTLY FUNDED — PROJECT	OTHER —
IS A REPORT ANTICIPATED?				
Every 18 months (approx.) "Water Resources Report" series.				
PARTICIPATION BY OTHER MINISTRIES:				

REMARKS:

Existing publications are for the following drainage basins: Big Otter Creek; Big Creek; Upper Nottawasaga River; Moira River; Duffins-Rouge (in press). Work is presently being carried out in the Grand, South Nation and the Holland-Black River basins, and in Northern Ontario. Surface and ground-water reports for Northern Ontario studies are to be completed in 1978.





## RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources - Hydrology and Monitoring

DATE: January 8, 1978

## PROJECT TITLE:

Ground Water Probability Mapping

## KEY WORDS:

Ground Water; Probability; Hydrogeology, ground-water mapping

## PRINCIPLE INVESTIGATOR

AND AFFILIATION U. Sibul, Head, Resource Assessment Group

## LIAISON OFFICER

OR SUPERVISOR As above

## RESEARCH

## CATEGORY:

INTERNAL X

GRANT —

UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X

SOLICITED CONTRACT — CONCURRENT PROJECT —

## OBJECTIVE:

To determine the yield of ground water to wells in counties throughout Ontario.

## DESCRIPTION:

The project involves mapping of ground-water resources in various counties in the Province. The maps are intended to provide basic ground-water data and interpretations on the availability of ground water throughout a county in order that water supply potentials can be assessed for various uses. These maps indicate the probable yields to wells, depths at which water is found and the depths of static water levels. Ground-water chemistry is also indicated.

DURATION OF PROJECT On-going YEARS PRESENT YEAR IS — YEAR REPORTING every 18 months DATE (also see remarks)

BUDGET: TOTAL DOLLARS TOTAL MAN YEARS  
~~TOTAL~~ ~~CURRENT YEAR~~ ~~CURRENT YEAR~~  
\$15,000 1

SOURCE OF FUNDS: REGULAR X SPECIAL JOINTLY  
WORK — MINISTRY — FUNDED — OTHER —  
PROGRAM FUNDING PROJECT

IS A REPORT ANTICIPATED? Yes - part of "Water Resources Map" Series

## PARTICIPATION BY OTHER MINISTRIES:

NIL

## REMARKS:

Published reports to date include the following counties: Lambton, Kent, Essex, Elgin, Brant and Haldimand. Work is progressing on Norfolk part of Haldimand-Norfolk Municipality, Peel and Simcoe.



RESEARCH AND DEVELOPMENT INVENTORY

SPANCH: Water Resources - Hydrology and Monitoring

DATE: January 8, 1978

PROJECT TITLE:

Evaluation of the Long Term Impact of Pollutants in Ground Water.

KEY WORDS:

Ground-water Contamination; Subsurface contaminants

PRINCIPLE INVESTIGATOR

AND AFFILIATION Dr. Hughes, Chief, Ground-Water Protection Unit

LIAISON OFFICER

OR SUPERVISOR As above.

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

GRANT ☐

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To examine the long-term impact of contaminants in ground-water flow systems in order to allow for the development of Ministry policies relating to the prevention and clean up of leaks, spills, etc., in hydrogeologically sensitive areas.

DESCRIPTION:

At the present time it is often difficult to quantify the impact of leaks and spills of refined hydrocarbons, the presence of unprotected sand/salt storage facilities, and the occurrence of accidental spills of chemicals, etc., on areal ground-water conditions because of the nature and speed of contaminant movement in the subsurface and the complexities of local hydrogeology. In order to be able to have meaningful policies and guidelines adopted to control the above-mentioned contaminating factors, it is necessary to promote an understanding of the long term potential of the problem through careful documentation.

DURATION OF PROJECT	Continuing	PRESENT YEAR IS	YEAR	REPORTING DATE	Ongoing
BUDGET:		TOTAL DOLLARS		MAN YEARS	
		<del>XXXXXXX</del>	CURRENT YEAR \$55,000	<del>XXXXXXX</del>	CURRENT YEAR 2 1/2
SOURCE OF FUNDS:	REGULAR WORK <input checked="" type="checkbox"/> PROGRAM	SPECIAL MINISTRY <input type="checkbox"/> FUNDING	JOINTLY FUNDED <input type="checkbox"/> PROJECT	OTHER <input type="checkbox"/>	

IS A REPORT ANTICIPATED? Reports are prepared on various projects, project aspects and case histories as work progresses.

PARTICIPATION BY OTHER MINISTRIES:

Involved on MTC Contamination Committees and in liaison with Consumer and Commerical Relations and most hydrogeological consultants outside

REMARKS: the MOE.



## RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology and Monitoring

DATE: January 8, 1978

## PROJECT TITLE:

Flowing Wells in Ontario

## KEY WORDS:

Flowing Wells; aquifers, hydrogeology

## PRINCIPLE INVESTIGATOR

## AND AFFILIATION

U. Sibul, Head, Resource Assessment Group

## LIAISON OFFICER

## OR SUPERVISOR

As above

## RESEARCH

## CATEGORY:

INTERNAL X  
GRANT —UNSOLICITED CONTRACT — MULTI-YEAR PROJECT X  
SOLICITED CONTRACT — CONCURRENT PROJECT —

## OBJECTIVE:

To map all flowing wells in Ontario and provide these data to water well drillers and others interested in ground-water development and management.

## DESCRIPTION:

The project consists of mapping the locations of all known flowing wells in Ontario, and providing these data (in the form of maps) to all licensed water-well drillers in the Province. The maps are designed to assist water-well drillers in anticipating flowing conditions prior to drilling. With proper well construction, flowing wells can be controlled to avoid unnecessary depletion of ground-water resources and to prevent drainage problems often associated with uncontrolled flowing wells.

DURATION  
OF PROJECT2 1/2 YEARSPRESENT  
YEAR IS2 YEARREPORTING  
DATEEnd of 1978

(see also remarks)

## BUDGET:

## TOTAL DOLLARS

~~XXXXXXX~~

CURRENT YEAR

\$5,000

## MAN YEARS

~~XXXXXXX~~

CURRENT YEAR

1/3

SOURCE OF  
FUNDS:REGULAR  
WORK X  
PROGRAMSPECIAL  
MINISTRY —  
FUNDINGJOINTLY  
FUNDED —  
PROJECT

OTHER —

## IS A REPORT ANTICIPATED?

Reports in the form of maps are prepared throughout the project.

## PARTICIPATION BY OTHER MINISTRIES:

NIL

## REMARKS:

To date all of southern Ontario has been covered and the relevant maps have been produced. The maps have had limited circulation to water well drillers only.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology and Monitoring

DATE: January 8, 1978

PROJECT TITLE:

Pollution from Land Use Activities Reference Group IJC Task C Studies (PLUARG)

KEY WORDS:

IJC, PLUARG; Great Lakes Water Quality; non-point pollution; land use.

PRINCIPLE INVESTIGATOR

AND AFFILIATION R.C. Ostry, Head - Technical Support Unit

LIAISON OFFICER

OR SUPERVISOR R.C. Hore, Supervisor - Hydrology and Monitoring Section

RESEARCH

INTERNAL ☒

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒

CATEGORY:

50% Federal Funding under IJC

GRANT ☒

SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

Under Task C of PLUARG, to examine the effects of various land uses and their associated pollutants on Great Lakes water quality. This study primarily deals with non-point pollution sources.

DESCRIPTION:

The role of the Hydrology and Monitoring Section has been to establish and maintain a network of water quantity and quality stations primarily in the Grand and Saugeen rivers and below selected agricultural watersheds to assist in examining the effects of runoff from various land uses including agriculture, urban, extractive industries, transportation and utility corridors, sanitary landfills, sewage sludge and spray irrigation, etc. The examination will result in a final Task C report to PLUARG delineating the extent of pollutant contribution, the relative significance of sources and practices, the degree of transmission of pollutants to boundary waters and possible remedial measures.

DURATION  
OF PROJECT

4 YEARS

PRESENT  
YEAR IS

4th YEAR

REPORTING  
DATE

1978

BUDGET:

TOTAL DOLLARS (1000,s)

MAN YEARS

TOTAL PROJECT  
836.0

CURRENT YEAR  
198.0

TOTAL PROJECT  
45

CURRENT YEAR  
8

SOURCE OF  
FUNDS:

REGULAR  
WORK ☐  
PROGRAM

SPECIAL  
MINISTRY ☒  
FUNDING

JOINTLY  
FUNDED ☒ OTHER ☐  
PROJECT 50% Federal Funding

IS A REPORT ANTICIPATED?

Final report anticipated - July of 1978

PARTICIPATION BY OTHER MINISTRIES:

Ontario Ministry of Agriculture & Food; Canada Dept. of Agriculture; Canada Dept. of Forestry plus contracts to consultants and universities.

REMARKS:

\*- Does not include L & T & Laboratories



RESEARCH AND DEVELOPMENT INVENTORY

Ontario

BRANCH: Water Resources - Hydrology and Monitoring

DATE: January 8, 1978

PROJECT TITLE:

Application of Geophysical Techniques to Ground-Water Studies.

KEY WORDS: Ground-water exploration; ground-water contamination; Geophysics, remote sensing, seismic explorations, electrical resistivity

PRINCIPLE INVESTIGATOR

AND AFFILIATION

Dr. E. Rodriques, Chief, Geotechnical Services Unit

LIAISON OFFICER

OR SUPERVISOR

as above

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☒   
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

~~XXXXXXXX~~ DESCRIPTION:

As labour costs escalate, making the installation of test holes and test borings for ground-water exploration and contamination studies uneconomical, the use of geophysical techniques as a means of carrying out subsurface investigations is being increased. It is also anticipated that existing geophysical techniques can be developed to aid in the tracing of contaminant plumes and defining soil attenuating capacities. This work is part of the

~~DESCRIPTION:~~ continuing service function of the Geotechnical Services Unit.

OBJECTIVE:

To enhance the application of geophysical techniques to ground-water supply and contamination studies in order to develop geophysics as an inexpensive method for subsurface hydrogeologic investigations.

DURATION OF PROJECT	Continuing	YEARS	PRESENT YEAR IS	YEAR	REPORTING DATE	Ongoing
BUDGET:	TOTAL DOLLARS		MAN YEARS			
	<del>XXXXX</del>	<del>XXXXX</del>	CURRENT YEAR		<del>XXXXX</del>	CURRENT YEAR
			45.0			2
SOURCE OF FUNDS:	REGULAR WORK	<input checked="" type="checkbox"/>	SPECIAL MINISTRY	<input type="checkbox"/>	JOINTLY FUNDED	<input type="checkbox"/>
	PROGRAM		FUNDING		PROJECT	OTHER <input type="checkbox"/>

IS A REPORT ANTICIPATED?

Reports are prepared on various projects and aspects as work progresses.

PARTICIPATION BY OTHER MINISTRIES:

Service function primarily to Regional Staff; however, requests for assistance

REMARKS:

from MTC, DOE and universities are answered.



RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology and Monitoring

DATE: January 8, 1978

PROJECT TITLE:

Mapping of Major Aquifers in Ontario

KEY WORDS:

Aquifers; Hydrogeology; ground-water mapping

PRINCIPLE INVESTIGATOR

AND AFFILIATION M. Turner, hydrogeologist

LIAISON OFFICER

OR SUPERVISOR U. Sibul, Head, Resource Assessment Group

RESEARCH

CATEGORY:

INTERNAL X

GRANT —

UNSOLICITED CONTRACT —

SOLICITED CONTRACT —

MULTI-YEAR PROJECT X

CONCURRENT PROJECT —

OBJECTIVE:

To map the location and extent of major aquifers in Ontario.

DESCRIPTION:

The maps are intended to provide basic ground-water data and interpretations of aquifer extents on which large-scale water supply potentials can be approximated. The project involves compiling and analysing ground-water data in order to determine the location and extent of major aquifers in the Province.

DURATION OF PROJECT	On-going	PRESENT YEAR IS	YEAR	REPORTING DATE	Every 10-12 Months
BUDGET:		TOTAL DOLLARS		MAN YEARS	
		<del>TOTAL PROJECT</del>	CURRENT YEAR	<del>TOTAL PROJECT</del>	CURRENT YEAR
			\$15,000		1
SOURCE OF FUNDS:	REGULAR WORK PROGRAM	<u>X</u>	SPECIAL MINISTRY FUNDING	JOINTLY FUNDED PROJECT	OTHER
IS A REPORT ANTICIPATED?	Yes - in form of aquifer maps				
PARTICIPATION BY OTHER MINISTRIES:	NIL				

REMARKS:

The Alliston Aquifer complex has been published. Some of the major aquifers in the Province which will be mapped include: the Oak Ridges Aquifer Complex, and Guelph (Lockport) Amabel, the Woodstock and Nepean aquifers. Other aquifers are yet to be identified.





Ontario

RESEARCH AND DEVELOPMENT INVENTORY

BRANCH: Water Resources - Hydrology & Monitoring Section DATE: January 8, 1978

PROJECT TITLE:

Application of Geophysical Techniques to Ground-Water Studies.

KEY WORDS:

Geophysics, ground-water exploration

PRINCIPLE INVESTIGATOR  
AND AFFILIATION

Dr. J. Greenhouse, University of Waterloo

LIAISON OFFICER  
OR SUPERVISOR

E. Rodriques, Chief, Geotechnical Services Unit

RESEARCH  
CATEGORY:

INTERNAL ☒   
GRANT ☐

UNSOLICITED CONTRACT ☐ MULTI-YEAR PROJECT ☐   
SOLICITED CONTRACT ☐ CONCURRENT PROJECT ☐

OBJECTIVE:

To delineate a buried bedrock channel in the Elora-Fergus Region, using geophysical techniques.

DESCRIPTION:

Information provided by local drillers has shown the existence of a buried valley in the Elora-Fergus region. The delineation of the depth and extent of this valley is important as it influences the flow of ground water. The project is being carried out jointly by the Geotechnical Services Unit and the University of Waterloo. The results will be incorporated in a student's M.S. Thesis at the University.

DURATION  
OF PROJECT

1/3 YEARS

PRESENT

YEAR IS

YEAR

REPORTING  
DATE

Dec. 1977

BUDGET:

TOTAL DOLLARS

TOTAL PROJECT  
\$6,084

~~XXXXXXX~~

MAN YEARS

TOTAL PROJECT  
1

~~XXXXXXX~~

SOURCE OF  
FUNDS:

Experience '77 ☒   
REGULAR WORK PROGRAM

SPECIAL ☐   
MINISTRY FUNDING

JOINTLY ☐   
FUNDED PROJECT OTHER ☐

IS A REPORT ANTICIPATED?

Yes

PARTICIPATION BY OTHER MINISTRIES:

None

REMARKS:



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